

No. 2. — *Collections from the Philippine Islands*

Introduction by THOMAS BARBOUR

Mammals by BARBARA LAWRENCE

Birds by JAMES L. PETERS

INTRODUCTION

BY T. BARBOUR

I was surprised one day when one of my young friends on the staff of this Museum came to me and said, "I am going to the Philippine Islands." I said, "There is no place in the world from which we so much need material, but we have no funds to send you." It is difficult to express how deeply I was touched when she told me she had saved up enough to make the trip without asking for any support from the Museum. Principally interested in mammals, which she prepared beautifully, she made also an excellent collection of birds, the skins of equal excellence.

The material dealt with in this paper Miss Lawrence collected on various of the Philippine Islands during the early part of 1937 and includes, also, some bats previously sent to the Museum of Comparative Zoölogy by Mr. Pedro de Mesa. The following report is not intended to represent a systematic effort to cover thoroughly any definite areas, with a view to working out their interrelationships, nor is it intended to be a review of either the Philippine birds, or the Philippine mammals. It will be observed, however, that the list of birds collected contains a number of new records for several of the islands, descriptions of two new races and critical or taxonomic remarks that may have been called forth during the study of the collection. With regard to the mammals, Miss Lawrence proposes merely to supplement Hollister's really excellent work published in 1912 and 1913 and Taylor's more recent very comprehensive paper published in 1934. A few new species, however, were found and two new genera are described. What is almost more important, some of the species made known years ago have been rediscovered and there has been a considerable extension of some of the recorded ranges.

Miss Lawrence was principally interested in collecting bats, so that the localities visited were often chosen because of their reported bat population; other collecting was incidental and to a certain extent experimental. As would be expected, then, the most interesting results are found in the section on Chiroptera. The new forms described in this

paper include four species and one genus of bats; while a new generic name is proposed for the hog-badger. Good series were taken of various bats hitherto known from very scattered, or unreliable, records. It has, therefore, been possible to redescribe some of the earliest recognized forms, notably *Rhinolophus rufus* Eydoux and Gervais and *Rhinolophus philippinensis* Waterhouse. Also to a certain extent, this collection has made it possible to confirm some species and to establish limits of variation for others.

Localities where collecting was done are listed more or less in the order visited: on Luzon, at Baguio in the Mountain Provinces; at Lagangilang, Bucay, and San Juan, all near Bangued in Abra Province; at Baay, 50 km. east of Bangued, Abra Province; at Balbalasang, 35 km. west of Lubuagan, Kalinga Province; and at the Montalban Caves near Manila, in Rizal Province. On Mindoro mammal collecting was done in the vicinity of Calapan; at Gumalpong about 20 km. from the foot of Mount Halcon, on the northern side; at the Tabucala Caves on the lower slopes of the northern side of the mountain; on Marinduque, at Torrijos near the east coast; at the Simbahan Caves, near Santa Cruz; and in the vicinity of Boac; on Mindanao, in the vicinity of Zamboanga; at Curuan, 50 km. northeast of Zamboanga; and at Davao on the Cotabato coast; on Basilan, at the Basilan Lumber Company's camp, 15 km. northeasterly of Maluso, and at the Basilan Plantation Company near Isabela; on Mactan Island at Opon directly across the channel from Cebu; on Cebu, at the Minglanilla Caves 20 km. west of Cebu, at Bogó and at Kawit near Bogó. Material was also sent in from Palawan, from Bacuit on the northwest coast, from Brooke's Point on the southwest coast, and from Puerto Princesa. In addition, bird collecting was done by Francisco Rivera on Mindoro in the vicinity of Lake Naujan, Calapan, Pola, Baco, and Bignay on the eastern slopes of Mount Halcon.

Miss Lawrence takes this opportunity to extend her sincerest thanks to Mr. Arthur Fischer, and the members of the Bureau of Forestry, and to Dr. A. S. Arguelles, and the members of the Bureau of Science, for their assistance which contributed so much towards the great success of this trip. She thanks also Mr. Pedro de Mesa and Mr. Francisco Rivera for their untiring work on the Mindoro trips. To the many other friends whose hospitality made it possible for her to visit some of the more remote parts of the islands, she is naturally most grateful. In addition she thanks Mr. Gerrit Miller and the members of his staff for making available the material at the United States National Museum, and to Dr. Glover M. Allen at the Museum of



Comparative Zoölogy she particularly wishes to express much appreciation for his unfailing patience and kindness in helping her with many difficult problems.

As Director of the Museum which Miss Lawrence has served so faithfully, it falls to my good fortune to thank her in the name of the Museum Staff, not only for the fine results obtained, but for the spirit of self-sacrifice which often moved her to travel under conditions of the utmost discomfort in order that slender means might be spun out to make it possible to visit more localities and thus increase the value of the material which she secured.

After leaving the Philippine Islands, Miss Lawrence visited southern Sumatra and the Island of Nias and greatly enriched the Museum by what she gathered there.

Is it surprising then that I have presumed to write this introduction, knowing full well that Miss Lawrence, writing herself, would not have made clear the magnitude of her generous aid to enrich the institution of whose staff she is so conspicuous an ornament?

## MAMMALS

BY BARBARA LAWRENCE

### FAMILY TUPAIIDAE. TREE SHREWS<sup>1</sup>

#### TUPAIA PALAWANENSIS Thomas

*Tupaia ferruginea palawanensis* Thomas, Ann. Mag. Nat. Hist., (6) **13**, 1894, p. 367 (Palawan, P. I.).

Three specimens, one of them young, were taken at Puerto Princesa, Palawan. The two adults, one male and one female, have the condylo-basilar length 43.8 and 43.7 respectively which agrees with two specimens that Lyon records from Puerto Princesa in being considerably shorter than the type. In his review of the Tupaiidae (1913) Lyon considers the specimens from Palawan as all one species, *palawanensis*.

### FAMILY SORICIDAE. SHREWS

#### SUNCUS LUZONIENSIS (Peters)

*Crocidura* (*P.*) *luzoniensis* Peters, Monatsb. Königl. Preuss. Akad. Wiss. Berlin, for 1870, 1871, p. 595 (Philippines).

This is a common species in Luzon. Good accounts based on long series are given by Hollister (1913, p. 302) and by Taylor (1934, p. 80). My three specimens come from Lagangilang, Abra Province.

#### CROCIDURA GRAYI Dobson

*Crocidura grayi* Dobson, Ann. Mag. Nat. Hist., (6) **6**: 1890, p. 494 (Philippine Islands).

The exact type locality of this species is not known. Hollister reports specimens from Benguet, Mountain Provinces, Luzon. The single individual at hand was caught on the same island at Lagangilang, Abra Province. Externally it is almost indistinguishable from specimens of *Suncus luzoniensis* which were caught at the same place and appear to be commoner.

### FAMILY PTEROPIDAE. FRUIT BATS

#### CYNOPTERUS BRACHYOTIS LUZONIENSIS (Peters)

*Pachysoma luzoniense* Peters, Monatsb. Königl. Preuss. Akad. Wiss. Berlin, for 1861, 1862, p. 708 (Yriga Volcano, South Camarines, Luzon, P. I.).

<sup>1</sup> Names of colors in quotation marks are after Robert Ridgway, "Color Standards and Color Nomenclature," published in Washington, 1912. External measurements, unless otherwise stated, were all taken by the author; length of hind foot always includes the claws.

Past attempts to determine the relationship between Bornean and Philippine bats of this genus have been unsatisfactory as not enough specimens have been available from either place. Now, thanks to the excellent series collected by J. A. Griswold, Jr., on Mt. Kinabalu, British North Borneo, it becomes possible to establish the limits of variation of the typical form and to show how *luzoniensis* falls outside of these.

*Description.* While the general pattern of color is much the same for all the small fruit bats of this genus, the actual shade and distribution of pigment are so variable within a given species as to make it extremely difficult to select a typical individual out of any series. *C. b. luzoniensis* can most readily be separated from typical *brachyotis* of Borneo by the much longer, softer fur with sharply contrasting bases to the hairs and by the olivaceous rather than brownish color of all the individuals, both male and female. This difference is very striking when series of both species are laid out together. In *luzoniensis* the hairs on the back below the bright ruff are deep "neutral gray" at the base with the tips dark "olive brown," almost "mummy brown," at the extreme tips and more olivaceous subterminally, while in *brachyotis* the bases of the hair are "hair brown" or "drab" imperceptibly grading into "Prout's brown" or, in the paler individuals, warm "ochraceous tawny" at the tips. The same contrasts hold true for females: in *luzoniensis* the gray bases are hardly noticeable and the tips are of a warmer shade than in the former race. The throat in males of both species varies from "burnt sienna" to a much brighter, more ochraceous tint, which may extend in a continuous wide stripe from back of the cheeks to below the mammary glands, almost forming a collar at the back of the neck, or it may be concentrated at the sides of the throat with only a slight patch around the mammary glands. The small contrasting patch on either side of the neck in females may vary from "antimony yellow" to "yellow ochre."

Both races are of about the same size, although on the average *luzoniensis* is slightly larger with a somewhat longer thumb. The difference is not enough to be of any value in identifying specimens.

*Skull.* The skull of *luzoniensis* is typically cynopterine as described by Andersen (1912, p. 587). It may be distinguished from that of *brachyotis* by its greater zygomatic breadth, and the greater width at the roots of the canines and across the lacrymal foramina; also the orbital ridges in the former are somewhat less inflated and the skull is slightly longer. The skull characters of these two forms are less dis-

tinctive than the color characters and there is a tendency, shown particularly in the females, to intergradation.

Peters (1867, p. 866), six years after he described *Pachysoma luzoniense*, put it into the synonymy of *brevicaudatus* (i.e. *brachyotis*). Gray (1870, p. 123), making no mention of Peters' form, describes two new races from the Philippines, *C. marginatus* var. *philippensis* and *C. marginatus* var. *Cumingii*. Matschie (1899, p. 76) returns to *luzoniense*, putting Gray's names into the synonymy, as does Hollister (Feb. 1912, p. 8). Andersen might have cleared this up when he wrote his review of the *Pteropidae* if there had been adequate material from the Philippines, but unfortunately he had only alcoholic specimens from which to draw his conclusions. Since the cranial differences alone are not sufficient to separate the two forms, it is quite understandable that he should have considered *luzoniensis* a synonym of *brachyotis*. Taylor follows him and, in addition, describes another species, *Cynopterus archipelagus* (1934, p. 182), from a single immature specimen caught on Polillo Island. The species is based on the slightly smaller size of the type, differently shaped nasal bones, more "squarish" molars, and lack of a central cusp on the last lower premolar and first lower molar. One other specimen, collected on the same island, he attributes to *brachyotis*. It is possible that a longer series might show that the differences are not as significant as he at first thought them to be.

As Taylor states (1934, p. 188), this little bat is apt to hang up during the day on the under side of palm leaves. Six of the nine specimens obtained I found hanging near the mid-ribs of green coconut fronds; one male and three females were together in one little cluster, two other females were hanging alone. The two from Basilan, one youngish, one adult, were the only bats to be caught in bird nets and the third was brought in by a native.

*Distribution.* On the evidence now at hand it is likely that all reports of *Cynopterus* from the Philippines should be attributed to *C. brachyotis luzoniensis*. These include records for Luzon, Mindanao, Palawan and Polillo. This additional series adds Mindoro and Basilan to the list.

#### PTENOCHIRUS JAGORII (Peters)

*Pachysoma (Ptenochirus) jagorii* Peters, Monatsb. Königl. Preuss. Akad. Wiss. Berlin, for 1861, 1862, p. 707 (Daraga, Albay Province, Luzon).

The two specimens at hand differ from Andersen's careful account of this species (1912, p. 645) in having the length of the upper cheek teeth

only 11.8 in an old male with the teeth very worn, and 12.2 in a female, and that of the lower cheek teeth 13.0 and 13.7 respectively. Andersen's measurements average about 1 mm. longer. The female appears young with the joints in the fingers not fully ankylosed and has a forearm measurement of only 77 mm. as against a minimum of 80 mm. given by Andersen (op. cit., p. 675). The male is of the same dark smoky brown as *Cynopterus brachyotis luzoniensis* with the tips of the hairs rather more "mummy brown" than "olive brown." The brown patch of short woolly hair on the rump mentioned by Taylor (1934, p. 179) contrasts strongly with the rest of the back. The bases of the hairs on the sides of the throat are dark "chestnut" with the tips paler and scarcely a trace of bright coloring around the mammary glands. The female is very gray both dorsally and ventrally, the back is "fuscous" and, presumably because it is young, lacks any olivaceous wash; the tinge of yellow on each side of the throat is very slight.

The single species of this genus is known from scattered records for Luzon, Mindanao, Mindoro and Tablas. The female examined was collected on Mt. Maquiling, Luzon, by Dr. R. E. Wheeler; the male comes from near Calapan, Mindoro. This latter was shot in the same coconut grove and hanging in similar fashion from the under side of a large frond as a specimen of *Cynopterus b. luzoniensis*. The two species when alive are most easily told apart by the thickened white ridge at the anterior margin of the ear and by the smaller size of the latter.

#### HAPLONYCTERIS gen. nov.

*Type species. Haplonycteris fischeri* spec. nov.

*Diagnosis.* This small fruit bat belongs to the cynopterine group as defined by Andersen (1912, p. xcv). Externally it may be distinguished by its small size, very long thumb, and the absence of a tail. In distribution of the fur it resembles quite closely the related genera *Aethalops* and *Sphaerias*, but the hind legs and membranes are less densely covered. As in *Aethalops*, the calcar is absent but the interfemoral membrane instead of being reduced to a mere ridge is fully 2.8 mm. wide. The lateral membrane, also, is wide in the region of the tibia and is attached to the outer margin of the first phalanx. The thumb is about two thirds as long as the third metacarpal.

In the absence of a postorbital foramen this genus agrees with *Aethalops*, *Balionycteris*, *Chironax*, *Thoopterus*, *Penthetor* and *Sphaerias* rather than with the more typical cynopterine bats, although the



square, blunt-nosed skull has very much the same shape and proportions as that of *Cynopterus*, from which it may further be distinguished by its greater interorbital breadth and short, heavy post-orbital processes. The premaxillary bones above the teeth are high with a longer median suture than in any of the related genera, a condition that is most closely approximated by that found in *Penthetor*. The tooth formula of *Haplonycteris* differs from that of any of its allies in having only one pair of incisors and four molariform teeth in both upper and lower jaws:  $i. \frac{1}{1} c. \frac{1}{1} pm. \frac{3}{3} m. \frac{1}{1} = 24$ . The single upper incisors are remarkably long and heavy and about half as high as the canines. They have the posterior side drawn out into a keel so that in cross-section they are almost triangular; viewed anteriorly the outer margins slope gradually away from the slightly rounded summits and the inner margins are in contact for almost their entire length. The intervening space between the canines and the incisors is scarcely as wide as the latter. The upper canines have no secondary cusp and there is only a trace of a heel. No distinct diastema sets the small Pm1/ apart from the canine and Pm3/. This latter is remarkable for its nearly equilateral triangular shape when seen from the side; further, the low inner cusp is placed much more nearly centrally than is usual in this group of bats and the ridge joining this with the outer cusp divides the tooth into nearly equal parts. The cusps of Pm4/ are lower and equidistant from the anterior and posterior borders of the tooth, with the transverse ridge passing directly across the middle. M1/ is small, tapering posteriorly and set at an angle so that the toothrows appear to converge at the back. In the lower jaw the incisors are in about the same proportion to the canines as in the upper, the wide trenchant crowns slope abruptly down and out. The canines almost meet posteriorly to the incisors and, as in the upper jaw, they have a very reduced heel and no trace of a supplementary cusp. Pm/1 is small and set closely between the canine and Pm/3. The latter has its crown drawn up into a very high cusp with the anterior margin sloping inward and backward, so that the actual point is almost in the center of the tooth when viewed from above. As in Pm4/, Pm/4 has the cusp placed more posteriorly than in other genera of this group, the transverse ridge crosses the tooth about one third of the way back from the anterior margin. M/1 is rectangular and low crowned. M/2 is entirely absent; it does not even appear to be deciduous as there is no thickening of the alveolar margin behind M/1 before the ramus slopes upward.

*Haplonycteris* belongs in the group of small cynopterine bats in which the postorbital foramen has become obliterated. In the reduction of the tooth formula with the strengthening of the remaining teeth, it appears to be the most highly evolved of this group. The unusually developed cusps and transverse ridges also indicate a greater degree of differentiation. Externally the distinguishing characters are less noticeable but the very long thumb has no parallel amongst the related genera.

This is the second genus of small fruit bat to be described from a single specimen taken in the highlands of Mindoro. The much larger genus *Harpyionycteris*, a very aberrant relative of *Dobsonia*, was described by Thomas (1896, p. 243) from a specimen collected by Whitehead, but no further specimens have been recorded since then.

#### HAPLONYCTERIS FISCHERI spec. nov.

*Type.* An adult male skin and skull, Museum of Comparative Zoology no. 35258, from Bignay, Mt. Halcon, Mindoro, P. I., collected by Francisco Rivera, 26 Apr. 1937.

*Description.* "Cinnamon brown" above as far as the region of the shoulders where the color gradually changes to pale "mummy brown" becoming darker anteriorly, particularly on the nose, cheeks, and crown of the head; bases of the hairs "drab." Entire under surface "wood brown" slightly washed with silvery down the center of the belly; neck glands "ochraceous tawny." Fur on the interfemoral membrane, forearm for one half its length, and lateral membrane as far as a line from the ankle to about the middle of the forearm, as well as a sparse scattering of fur on the feet, "cinnamon brown"; sprinkling of fur on the rest of the lateral membranes the same color. The wings are chiefly notable for the size of the thumb and its long claw which is a third again as long as those on the hind foot; the claw on the second finger is also well developed. The fourth metacarpal is conspicuously shorter than the third and fifth which are subequal.

*Skull.* The cranial characters are as described for the genus. In addition, the palate is short, not extending farther posteriorly than the level of the postorbital processes; the nasal bones are short and flattened at the base; the swellings at the orbital ridges and between them are pronounced. The dentition in both the upper and the lower jaws is remarkably heavy.

*Measurements.* The type measured as follows (the external measurements were taken on the dried skin by the author): *External:* hind foot,

10.8; forearm, 49.0; thumb, 23.1; third metacarpal, 35.0; fourth metacarpal, 31.2; fifth metacarpal, 33.4; *cranial*: total length, 25.0; basal length, 22.1; palatal length, 10.2; zygomatic width, 15.3; mastoid width, 11.3; interorbital width, 6.3; width outside molars, 8.2; combined length, upper cheek teeth, 8.6; combined length, lower cheek teeth, 8.6.

The only specimen obtained comes from the slopes of Mt. Halcon and was shot while it was flying at dusk. It has given me great pleasure to name this interesting new bat for Mr. Arthur Fischer, retired Director of the Bureau of Forestry in Manila, through whose kind and interested assistance I was able to obtain the help and coöperation of members of the Bureau in many of the outlying districts of the Philippines.

*ROUSETTUS AMPLEXICAUDATUS* (E. Geoffroy)

*Pteropus amplexicaudatus* E. Geoffroy, Ann. Mus. d'Hist. Nat., Paris, **15**, 1810, p. 96 (Timor).

These common little fruit bats are widespread not only in the Philippines but in some of the neighboring islands of the Dutch East Indies. My numerous records do not actually extend their known range, but fill in gaps where they were presumed to occur. Series were taken on Luzon from Bucay and Lagangilang in Abra Province; on Mindoro from Calapan on the East Coast and from Mamburao on the West Coast; on Lubang; on Cebu from Kawit near Bogó; and on Mindanao from the Dilirig Caves in the Misamis District and from Zamboanga. In spite of Taylor's findings to the contrary (1934, p. 176), practically all of my specimens as well as some that had previously been sent to the Museum of Comparative Zoology, were collected from large cave colonies. Of the three exceptions, one was brought in by natives and two were shot at dusk flying around a flowering acacia tree. The sixty-six individuals examined all fall within the same limits of variation without dividing into local races. Andersen (1912, p. 40) gives a good detailed description of this species.

*PTEROPUS HYPOMELANUS CAGAYANUS* Mearns

*Pteropus cagayanus* Mearns, Proc. U. S. Nat. Mus., **28**, 1905, p. 433 (Cagayan Sulu Island, P. I.).

Two examples of this race were taken on Marinduque near Boac. Both agree in having the mantle much more richly colored than the type and paratypes of *cagayanus*, the hairs of the mantle shade gradu-

ally from "mahogany red" at the extreme tips through "russet" to "warm buff" at the bases. With the exception of one individual from Panay which has the mantle "deep chrome," none of the series in the U. S. National Museum is as pale as the type series, although there is a considerable range of individual variation amongst these specimens. Hollister in his list of Philippine mammals (1912, p. 9) uses *cagayanus* only for those caught on Cagayan Sulu Island and refers those found on Dinagat, Guimaras, Leyte, Mindanao, and Panay to *P. h. hypomelanus*, the race that was first described from Ternate. Andersen (1912, p. 123) after comparing Mearns' paratypes with a topotype in the British Museum points out that the pale color of the mantle in the type series is probably due to bleaching, and calls all of the Philippine specimens *P. h. cagayanus*, restricting *h. hypomelanus* to those found in the Halmahera group. The absence of cranial characters separating the Cagayan examples from those found in the rest of the Philippines bears out Andersen's conclusions.

#### PTEROPUS VAMPIRUS LANENSIS Mearns

*Pteropus lanensis* Mearns, Proc. U. S. Nat. Mus., **28**, 1905, p. 432 (Pantar, near Lake Lanao, Mindanao, P. I.).

Seven specimens were collected at Lagangilang, Abra Province, Luzon, and four from near Zamboanga, Mindanao. Of these, all but two from Luzon and one from Mindanao were melanistic. The others had the bright ochraceous mantle described by Andersen (1912, p. 360). A big colony of these bats was found in a tree in a large swamp near Zamboanga. I was there in April and at that season each evening they used to fly in great numbers over to Basilan to feed, a distance of about seventeen miles.

#### PTEROPUS TABLASI Taylor

*Pteropus tablasi* Taylor, Monographs of the Bureau of Science, Manila, no. 30, 30 June 1934, p. 169 (near Odiongan, Tablas, P. I.).

The smallest of this series of three specimens from Mindoro Island has the forearm and hind foot slightly larger than the measurements taken by Taylor from the type, the only specimen obtained by him. Since the cranial measurements, particularly the lengths of the upper and lower cheek teeth, are very nearly the same as in Taylor's specimen, it is possible that his type is a young adult, in which case the average greater size of the three specimens at hand is to be expected.

The delicate skull, relatively large orbits which are greater in diameter than the lacrymal width of the skull, the moderately developed teeth, hairy tibia, and especially the strongly contrasting dark bases and pale tips of the bicolored fur, put this species into the *temminckii* group as defined by Andersen (1912, p. 315). The palest specimen has the tips of the hair on the back "cinnamon-buff," while the warmest one is almost "ochraceous orange"; the rather woolly mantle is not sharply defined, however, the lower back in all three specimens has the fur more silky and the less ochraceous tips of the hair are shorter. In all of them the contrast between the tips of the hair and the "clove brown" bases is very marked; the throat is almost as pale as the back and the rest of the under surface may be "clay color" or as dark as "russet" changing to "clove brown" at the extreme bases of the hairs.

Two other small species of *Pteropus* have been described from the Philippine Islands, both coming from the southern part of the group. *P. pumilus* Miller (1910, p. 394) is about the same size as *tablasi*, but has the bright mantle ending in a distinct line below the shoulders; the bicolored fur of the lower back never has the bases as dark as in *tablasi*, and is well sprinkled with entirely buffy hairs, giving it a peppered appearance instead of the uniformly pale-tipped aspect of the more northerly species. This latter has the forearm and tibia slightly more heavily furred. The skull in *pumilus* is distinctly narrower, especially when viewed posteriorly and the molar teeth are more slender. *P. balutus* Hollister (1913, p. 111) differs in similar but more extreme fashion from *tablasi*. In the former, the pale shade of the lower back is produced by a predominance of light buff in a mixture of pale and dark hairs, rather than by the pale, contrasting tips of a uniformly bicolored fur. The skull of *balutus* is larger and Pm4/ appears bigger and more nearly square in outline than in *tablasi*. The three specimens of *tablasi* show considerable variation both in external and in cranial measurements.

All three individuals were shot at night, two from near Gumalpong, inland from Calapan, Mindoro Island, where they were feeding on the partially ripened fruit of kapok trees; the third, from the outskirts of Calapan, was feeding in an alemendras tree.

*Measurements.* Measurements are given in the following order: male, M. C. Z. 35215, females, M. C. Z. 35216, 35217. *External:* total length, 180, 178, 160; hind foot, 35, 33, 31; ear, 26, 22, 23; forearm, 115, 111, 105; *cranial:* total length, 52.3, 51.8, 48.5; basal length, 47.1, 46.4, 43.7; palatal length, 24.5, 24.2, 23.1; zygomatic width, 29.6, broken, 22.3; mastoid width, 18.7, 17.6, 17.4; width outside molars,



14.4, 14.2, 13.8; length upper cheek teeth, 19.2, 19.2, 17.9; length lower cheek teeth, 21.6, 21.6, 19.9.

*Distribution.* So far this species is only known from four examples, the type from Tablas Island off the East Coast of Mindoro and these additional three specimens from near Calapan, Mindoro Island.

#### ACERODON JUBATUS JUBATUS (Eschscholtz)

*Pteropus jubatus* Eschscholtz, Zool. Atl., Berlin, pt. 4, 1831, p. 1 (Manila, Luzon, P. I.).

Five specimens of this common fruit bat were taken on Luzon at Lagangilang, in Abra Province, three were caught on Mindoro at Pasi and one near Calapan. There is considerable variation in the amount of buffy hair mixed with the dark on the lower back and the bright patch on the head may be restricted to the crown or may extend in a thin line backwards between the shoulders. One of the specimens was shot while feeding at night in a kapok tree, the others were brought in by natives.

#### ACERODON JUBATUS MINDANENSIS Andersen

*Acerodon jubatus mindanensis* Andersen, Ann. Mag. Nat. Hist., (8) 3, 1909, p. 26 (Mindanao, P. I.).

Andersen separates this race from the more northerly one solely on the basis of the slightly larger size of the type, the only specimen examined by him. Taylor lists fourteen more specimens taken on the Cotabato Coast of Mindanao, the forearm measurements of which average longer than those given by Andersen (1912, p. 430) for typical *jubatus*. Comparison of two individuals from Basilan with the series of *jubatus* from the more northerly islands shows a similar, though less pronounced, difference in forearm length; more noticeable is the much darker color of the Basilan animals. One of them has the bright patch on the crown reduced to the faintest sprinkling of buff-tipped hairs with no trace of "chestnut" at the sides of the throat. In the other the short "light buff" tips of the hairs on the crown fail to conceal the dark bases, and there is only the slightest tinge of "ochraceous buff" where the small bright patch merges with the short chestnut mantle. Clinging to the first specimen was a young male which also had only a very slight trace of buff on the crown.

A comparison of the long series of both *jubatus* and *mindanensis* in the U. S. National Museum shows great individual variation for each race with the bright phase more predominant in the former. On an

average the skulls of *mindanensis* are slightly larger than those of *jubatus*, although the proportions are the same.

The specimens of *mindanensis* were all shot from the same small colony in the forest northeast of Maluso on Basilan. Previously this race has been reported from the islands of Mindanao, Cabo, and Banga.

#### EONYCTERIS ROBUSTA Miller

*Eonycteris robusta* Miller, Proc. Biol. Soc. Washington, **26**, 22 March 1913, p. 73 (Montalban Caves, near Manila, Luzon, P. I.).

Gerrit Miller's description of this species constitutes the first record for the genus *Eonycteris* in the Philippine Islands. Although it is notably gregarious, he had only one specimen, which served as the type; subsequently both Edward Taylor and myself took topotypical series of this bat from the same cave. In addition I have a male and a female from San Juan, Abra Province, and a female from Baguio in the Mountain Provinces, both on Luzon; four males and three females from the Dilirig Caves, Misamis District on Mindanao; and two females from Lubang Island. From this material it appears that the species does not readily split into local races but is, on the contrary, a wide-ranging, variable form that probably is distributed over most of the islands. The existence of a second very distinct species of *Eonycteris* in the Philippines was first recognized by Taylor (1934, p. 127). Unfortunately he erroneously assumed that the name *robusta* applied to the form having an anal gland and a short tail. Examination of Miller's type shows that the reverse is the case, so *longicauda* Taylor goes into the synonymy of *robusta* and I am proposing a new name for the other form.

#### EONYCTERIS SPELAEA GLANDIFERA subsp. nov.

*Type.* An adult male skin and skull, Museum of Comparative Zoölogy no. 35159, from the Montalban Caves, Rizal Province, Luzon, P. I., collected 27 Feb. 1937, by Barbara Lawrence.

*Description.* On the basis of color alone this species is indistinguishable from *robusta*. The type, the brightest colored specimen I have examined, has the entire upper parts "chestnut-brown"; others in the series are more nearly "bister." The sparse, short fur on the under surface is "light drab" with a grayish wash on the tips of the hairs that is less pronounced posteriorly. To a certain extent the intensity of color on the throat in males varies with the age of the specimen; in the

type and in most of the examples seen it is "tawny olive." Two males from Marinduque differ in showing considerably more red pigment on the throat, the one being "tawny," the other "russet" mixed with "ochraceous-tawny." As a similar variation in throat color from orange to a reddish shade occurs in species belonging to related genera of small fruit bats, these two individuals are probably nothing more than variants which, when longer series are available, may be found to intergrade with the commoner form. Females all have the throat the same color as the belly. The short, irregular fur in this species is so sparse as scarcely to cover the lower back, belly, and top of the head, and barely a third of the forearm has a slight sprinkling of fine hairs. A topotypical specimen of *spelaea*, on the other hand, has longer, relatively more dense fur which completely covers the body and extends at least halfway up the forearm. *E. spelaea* may be further recognized by its very short tail.

*Skull.* The skull is chiefly remarkable for its large, broad teeth, particularly the two anterior upper molars, lower premolar four and molar one, the length of both tooth rows and the shape of the ramus of the lower jaw. *E. robusta*, the only other member of the genus found in the Philippines, differs from this species in having smaller, more slender molariform teeth that are not visible, as they are in *glandifera*, when the skull is viewed from above. Further, in the former the tooth rows are shorter and the braincase is more deflected. In *glandifera* the coronoid process of the lower jaw is more rounded and the angle of the jaw forms a rounder, more abruptly downward-projecting process. Compared with the more closely related *E. spelaea* of Burma, *glandifera* is somewhat larger with a more heavily built skull, less tapering rostrum and much greater width across the occipital crests and mastoid region. In both races the molariform teeth are of the same massive form, visible when the skull is seen from above; in the former they are actually smaller with the exception of the last molar which is variable. Skulls of *glandifera* from Luzon and Mindanao show all stages of intergradation within certain rather wide limits; those from Marinduque are definitely smaller with shorter rostra and tooth rows. Such a difference found in an island form might appear to be important were it not for the fact that two females caught in the same cave on Luzon diverge just as widely. This, together with the occurrence of typical *glandifera* in both the north and the south of the Philippine group, makes it more reasonable to regard the Marinduque specimens merely as extremes of a wide-ranging form rather than as a separate local race.

*Measurements.* Under the heading of *E. robusta*, Taylor (1934, p. 128) gives a series of measurements of specimens of *E. s. glandifera* caught in the same cave as some of the individuals at hand. In the following measurements, for comparative purposes, those of the type are given first, and those of a topotypical specimen of *E. spelaea* from Moulmein, Burma, next. *External: glandifera* only, total length, 141; tail, 16; hind foot, 19; ear, 21; forearm, 76; *cranial: glandifera* only, total length, 36.8, 36.1; total length to canine, 35.3, 34.7; basal length to canine, 31.2, 30.4; palatal length, 17.5, 17.6; zygomatic width, 21.7, 21.3; mastoid width, 15.5, 14.3; width across the occipital crests, 14.5, 13.0; width outside molars, 9.9, 9.0; length upper cheek teeth, 13.7, 12.4; length lower cheek teeth, 14.6, 14.1.

The two Philippine species of *Eonycteris* are most readily distinguished from each other by the presence in *E. s. glandifera* of paired anal glands in both male and female, a shorter tail, and much shorter lower leg, measured from the upper end of the tibia to the tip of the claws. In *glandifera*, also, the fur is shorter, particularly on the ventral surface, and the scrotal pouches are furred, whereas in *robusta* they show as naked, wrinkled areas of skin when the testes are withdrawn. *E. robusta* has the forearm slightly longer and the two terminal phalanges of the third finger are markedly so. *E. s. glandifera* is clearly the most closely related to the other described members of the genus; *robusta* is an aberrant form that differs from Andersen's summary of generic characters (1912, p. 729) in having no anal glands and in having the tail much longer than the hind foot with claws. In other respects this species falls well within the limits of variation of the genus as analyzed in the above-mentioned account.

In the Montalban Caves on Luzon and in the Dilirig Caves of Mindanao both species were taken together and Taylor (1934, p. 131) states that in the former at least they hang up separately. In the other caves where I collected them only one or the other of the species was taken.

A careful comparison with five specimens from Pematang Siantar and one from Lian si Peghe in Sumatra fails to show any consistent characters setting them apart from the Philippine *E. s. glandifera*. Andersen (1912, p. 735), on the basis of a short series of alcoholic specimens from Lian si Peghe, considered the Sumatran *Eonycteris* to be the same as that occurring in Burma. This further series shows that either the Sumatran and the Philippine individuals are actually the most closely related, or else have diverged from a mainland stock along such similar lines as to be indistinguishable from each other.

## MACROGLOSSUS LAGOCHILUS LAGOCHILUS Matschie

*Macroglossus lagochilus* Matschie, Megachir. Berl. Mus. für Naturk., 1899, p. 96 (Buru).

Andersen (1912, p. 764) gives a good description of this species together with measurements and an account of the synonymy. Though a wide-ranging form, occurring through Borneo, Cagayan Sulu, Philippines, and the Amboina group, it appears to be solitary, and relatively few have been caught in the Philippines. My specimen was shaken out of a rolled-up hemp leaf on a plantation inland from Calapan on Mindoro; with five men at work only this single individual was caught during an entire day's search; another, presumably of the same species, escaped. This is the first record of *Macroglossus l. lagochilus* from Mindoro, although previously it has been reported from Panay, Tablas, Samar, Cuyo and Negros.

## FAMILY EMBALLONURIDAE. SHEATH-TAILED BATS

## TAPHOZOUS PHILIPPINENSIS Waterhouse

*Taphozous philippinensis* Waterhouse, Proc. Zool. Soc. London, 13, 14 Jan. 1845, p. 9 (Philippine Islands).

I have followed Hollister (1913, p. 307) in considering *Taphozous philippinensis* distinct from the Indian *Taphozous melanopogon*, with which Dobson (1878, p. 380) considers the former to be synonymous. Two males from India both have the black beard well developed and surrounded by an area of very much elongated, slightly stiffened hairs, the tips of which are "cinnamon" rather than the grayer shade of the lower belly. A single male from Yunnan has a similar colored area of elongated hair on the throat but no trace of a black beard. Two males from the Philippines, on the other hand, show no marked specialization of the hairs of the throat. Further, the series of females from the Philippines shows the very pale under parts, almost white posteriorly, that Waterhouse particularly notes as characteristic of *philippinensis*. Males from the same place are darker bellied than the females. The single skull of *melanopogon* from Yunnan appears to be larger with a somewhat longer rostrum than the skulls of *philippinensis*. As the forearm measurements are also slightly longer in all the specimens of *melanopogon*, it is possible that additional material might show a significant size difference between the two species.

Six females from Calapan, Mindoro, constitute the first record for



that island. Two further specimens were taken on Luzon, in Abra Province, at Bucay. All were found in caves. In addition the museum has a long series of these bats taken at C'abra island, off Lubang, by Pedro de Mesa.

#### SACCOLAIMUS PLUTO (Miller)

*Taphozous pluto* Miller, Proc. U. S. Nat. Mus., **38**, 19 Aug. 1910, p. 396 (Mercedes, Mindanao, P. I.).

Miller (1910, p. 396) described *T. pluto* from Mercedes near Zamboanga on Mindanao and listed two other specimens from Pandon, Albay, Luzon, as the same species. Hollister (1913, p. 308) makes a new species, *Taphonycteris capito*, of the two latter on the basis of their slightly smaller size, shorter pollex and metacarpals and larger, broader skull. In view of the range of variation shown by a series of five males from Mindoro Island, these differences appear less significant. In some instances the measurements of the types of *capito* and *pluto* actually fall within the extremes of the Mindoro series; other measurements taken from this series, in particular the length of the metacarpals, the interorbital and the mastoid widths are slightly nearer those for *capito*, while the length of the pollex, total length of the skull and length of the cheek teeth are somewhat closer to those for *pluto*. The fact that the Mindoro series occupies a somewhat intermediate position between the two described Philippine species of this genus and the wide range of variation in these five specimens from the same place make it seem probable that there is only one form, *pluto*, in the Philippines of which *capito* becomes, therefore, a synonym. The three specimens first mentioned above, constitute the previous Philippine records for this genus. These five additional specimens add Mindoro to the list. All are males and were found hanging up in a hollow coconut palm.

#### FAMILY MEGADERMIDAE. BIG-EARED BATS

##### MEGADERMA SPASMA SPASMA (Linnaeus)

*Vespertilio spasma* Linnaeus, Syst. Nat., Ed. 10, **1**, 1758, p. 32 (Ternate).

A series of twelve specimens from Abra Province in Luzon shows variations of from 35 to 40 mm. in the length of the ear and from 15.5 to 19.5 mm. in the length of the hind foot, although the length of the forearm only varies from 55 to 58 mm. Two specimens from Cebu both have the ears 41 mm. and the hind foot 19 and 19.5 mm. respectively. Cranial characteristics of the Cebu animals are quite the same

as those of the Luzon series. Five of the latter were caught in the same hollow tree. The others, as well as the two from Cebu, were found in caves. Previously this species has been recorded from Luzon and Mindanao.

## FAMILY RHINOLOPHIDAE. LEAF-NOSED BATS

### *RHINOLOPHUS VIRGO* Andersen

*Rhinolophus virgo* Andersen, Proc. Zool. Soc. London, **2**, 1905, p. 88 (S. Camarines, Luzon, P. I.).

Compared with a specimen of typical *Rhinolophus borneensis* from Mt. Kinabalu, British North Borneo, the series of *R. virgo* agrees in most details with Andersen's excellent description, particularly in the smaller size, narrower horseshoe, and narrower nasal swellings. The ears, however, differ in that they are fully as large as those of *borneensis*. In color the single Philippine skin appears brighter than the Bornean one. In the former the extreme tips of the hairs on the back are "mummy brown," the bases of the hairs being "wood brown," and the belly is "ochraceous-tawny"; the Bornean skin is a uniform "chestnut-brown," slightly grayer on the under side. In addition to the type, Andersen had at hand another alcoholic specimen from the same locality: Taylor (1934, p. 217) reports two specimens, the one taken at Saub, Cotabato, Mindanao, the other at Bud Daho, eastern Jolo. The three specimens in the Museum of Comparative Zoölogy, one skin and skull from San Juan, near Bangued, Abra Province, Luzon, and two alcoholics collected by Pedro de Mesa on Lubang, serve to extend the known range in a north and westerly direction. Taylor's individuals were caught in dense jungle growth, mine in a small cave together with one specimen of *Hipposideros bicolor antricola*. The records seem to indicate that if not actually solitary this smallest Philippine rhinolophe does not roost in groups of more than two or three and possibly for this reason is not actually as rare as it appears in collections.

### *RHINOLOPHUS PHILIPPINENSIS PHILIPPINENSIS* Waterhouse

*Rhinolophus philippinensis* Waterhouse, Proc. Zool. Soc. London, **11**, 1843, p. 68 (Philippines).

Although this is one of the earliest known bats from the Philippines, the type specimen is the only identifiable example recorded. Study of

this additional series makes it possible to add some further interesting details.

*Description.* Hairs of the back "Hay's brown" to "light seal brown" very slightly tipped with "vinaceous buff"; the general appearance is of a soft-furred, dark brown bat with a faint silvery wash most pronounced anteriorly. Below, although the bases of the hairs are darker, the longer buffy tips make the ventral surface appear paler than the back. All three of my examples agree with the original description in having remarkably large ears, about two thirds as long as the head and body, with very big accessory lobes. The nose leaves, also, show an unusual development. The sella is high and broad with parallel margins and a slightly rounded summit; the base of the sella, together with the internasal lobes, forms the large cuplike expansion considered by Andersen (1905, p. 246) as characteristic of this section of the *philippinensis* group. The connecting process starts from well below the summit of the sella. The horseshoe is very wide, especially in the midline below the nares. The wings show the relatively unspecialized condition in which the fourth metacarpal is longest with the fifth slightly shorter, and the distal phalanx of the third finger is scarcely as long as, or shorter than, one and one-half times the length of the proximal (see measurements).

*Skull.* Andersen has given a very good description of the distinctive cranial characters of this group of bats. My specimens agree in having only a trace of a sagittal crest that slopes very gradually to a shallow postnasal depression. The nasal swellings are large, the four anterior ones forming the margin of the nasal aperture, instead of being separated from it by a thin brim of bone. The palatal bridge is about one half the length of the maxillary tooth row; measured along the median line it extends from the middle or front of Pm4/ to a point parallel with the posterior edge of M2/. The skull as a whole is light and slender, tapering gradually from the mastoid processes to the roots of the canines with no expansion of the roots of the zygomata. The canine and Pm4/ are widely separated so that Pm2/, placed well in the tooth row between them, is equally removed from each by a small but distinct space. The two small, bilobed upper incisors are separated from each other by a space about equal to their combined widths. In the lower jaw the minute Pm/3 is also in the tooth row and is either barely separated from Pm/2 and Pm/4 or is separated by a space as wide as the tooth itself.

*Measurements.* Measurements of three specimens are given in the following order: female, 35007; males, 35008, 35009. *External:* total

length, 86, 82, 87; tail, 33, 35.5, 30; hind foot, 10, 10.5, 10; ear, 34, 32.5, 35; forearm, 57, 56.5, 57; proximal end of tibia to tip of claws taken on dried specimen, 35.9, 36.0, 36.0; proximal phalanx 3rd finger, 17.3, 17.0, 17.6; distal phalanx 3rd finger, 23.2, 25.5, 23.8; nose leaf: breadth of the sella, 5.5, 6.0, 5.6; breadth of cuplike expansion, 9.3, 9.4, 9.3; length from base of cuplike expansion to top of sella, 12.8, 13.7, 13.5; breadth of horseshoe, 12.1, 12.0, 12.6; height of horseshoe, 11.3, 12.0, 11.1; *cranial*: total length to canine, 22.4, 23.0, 22.8; length to front of nasal swellings, 19.6, 20.4, 20.1; basal length, 18.5, 18.7, 18.8; palatal length, 3.9, broken, 4.0; zygomatic width, 9.9, broken, 9.5; mastoid width, 10.8, 11.0, 10.8; width outside molars, 7.3, broken, 7.0; length upper cheek teeth, 8.2, 8.7, 8.4; length lower cheek teeth, 8.7, 9.1, 8.7.

No comprehensive account of this species has been published since Waterhouse's original description in 1843 which deals almost entirely with the characters of the ears and nose leaves. There is no mention of the skull and, as the single specimen examined was in alcohol, the color notes are not very precise. Dobson (1878, p. 107) redescribes the type, adding little except a list of measurements which he took himself that are somewhat smaller than those of my specimens. Hoffman (1887, p. 24) attributes another individual collected on southern Mindanao to the same species, but he gives no description, so it is not possible to decide whether his identification is correct. Andersen (1905, pp. 243-247) gives an excellent account of the *philippinensis* group of *Rhinolophus*. He subdivides it into three sections, putting *philippinensis* and *achilles* from the Key Islands into the first and most primitive; with a few exceptions, the characters given are those for each subdivision as a whole, not for individual species. He does, however, include figures of a skull of *R. philippinensis*; no locality is mentioned, but as most of his material came from the British Museum, I presume it is that of the type. The average wing indices which he includes are for both *philippinensis* and *achilles* and differ considerably from an average taken for the six individuals of two subspecies that I have measured. In the following figures, the first are taken from Andersen (1905, p. 257), the second from my specimens: fa., 1,000, 1,000; 3rd metacarpal, 694, 749; 4th metacarpal, 716, 755; 5th metacarpal, 712, 753; 1st phalanx of 3rd finger, 290, 305; 2nd phalanx of 3rd finger, 386, 437, showing that in the latter the metacarpals, especially the third, are longer in proportion to the fa., and there is less difference in length between the 1st and 2nd phalanges of the 3rd finger. All three specimens were caught at Bucay in Abra Province on Luzon.

The type of *R. philippinensis* was collected by Hugh Cuming during the course of three years' collecting in the Philippines. Although he visited most of the large islands, he spent the greater part of his time on Luzon so it seems probable that the type came from there. I therefore designate Luzon as the type locality and consider specimens from Bucay, Abra Province, to be typical.

*RHINOLOPHUS PHILIPPINENSIS ALLENI* subspec. nov.

*Type.* An adult female, skin and skull, Museum of Comparative Zoölogy no. 35097 from the lower slopes of Mt. Halcon, northern side, near Calapan, Mindoro, P. I., collected 7 March, 1937, by Barbara Lawrence.

*Description.* Compared with three specimens from Bucay, Abra Province, Luzon, representing the typical race, this form may be distinguished by its slightly smaller size, smaller ears, and differently shaped nose leaves. While the forearm is almost as long as that of *R. philippinensis*, the lower leg measured from the proximal end of the tibia to the ends of the claws is much shorter. The ears are shorter, both actually and in proportion to the total length, and their maximum width is less. The nose leaves are smaller, the sella and the cup-shaped expansion are narrower; the edges of the horseshoe instead of curving out and up with a smooth even border are somewhat crenellate with two pronounced notches on either side of the small triangular projection halfway up the margin. The lower lobes that extend downward covering the upper lip are narrower than in the preceding form. There is no difference in color between these two races. The relative lengths of the wing bones are the same in both except that in *alleni* the terminal phalanx of the third finger is as long as, or slightly longer than, one and one-half times the proximal.

*Skull.* The skull of *R. p. alleni* is similar to that of *R. p. philippinensis*: slender, with weak zygomatic arches; occipital crest reduced to a thin line; large nasal swellings that actually form the upper and lateral margins of the nasal aperture without any intervening bony plate; small teeth with a wide space between the canine and Pm4/; Pm2/ well developed, triangular in cross-section, the cingulum around the single cusp very noticeable; Pm/3 in the tooth row, a trifle more crowded in the former than in the latter, though this is a variable character. Skulls of *R. p. alleni* may be readily distinguished from those of the typical form by their smaller size; the difference is more one of length than of width. The nasal swellings of the former are narrower as well as much shorter antero-posteriorly, and the back



ones that form the anterior border of the temporal fossa are less inflated. As would be expected in a smaller skull, the tooth rows in both upper and lower jaws are shorter with a corresponding decrease in individual tooth size. The palatal bridge in *alleni* is relatively shorter, extending from a point opposite the middle or the posterior edge of Pm4/ to one back of M2/.

*Measurements.* Measurements of the three specimens, all females, are given in the following order: the type, no. 35097, then 35098 and 35099. *External:* total length, 82, 85, 83; tail, 31, 30, 29; hind foot, 12, 12, 11; ear, 32, 30, 28; forearm, 55, 56, 55; proximal end of tibia to tip of claws taken on dried specimen, 33.5, 32.3, 33.1; proximal phalanx of third finger, 16.4, 16.6, 16.2; distal phalanx of the third finger, 23.4, 23.9, 24.2; nose leaf: breadth of the sella, 4.9, 5.0, 4.4; breadth of cuplike expansion, 7.6, 7.3, 7.8; length from lower margin of cuplike expansion to top of sella, 11.7, 11.8, 11.4; breadth of horseshoe, 11.3, 11.0, 11.5; height of horseshoe, 10.5, 10.3, 10.3; *cranial:* total length to canine, 21.3, 21.9, 21.5; length to front of nasal swellings, 18.5, 18.9, broken; basal length, 17.5, 18.0, 17.7; zygomatic width, 9.4, 9.6, 9.4; mastoid width, 10.1, 10.5, 10.3; width outside molars, 6.9, 6.9, 6.8; length upper cheek teeth, 7.7, 8.0, 7.9; length lower cheek teeth, 8.0, 8.4, 8.5.

Three females of this subspecies were collected in two caves close together on the lower slopes of Mt. Halcon. It is evidently not very common as these were the only ones in a long series of other bats from the same caves. Both races of *Rhinolophus philippinensis* may readily be distinguished from other members of the genus found in the Philippines by their enormous ears and their extraordinarily developed nose leaves. The race is named for Dr. G. M. Allen to whom I am most grateful for much help in the preparation of this paper.

#### RHINOLOPHUS RUFUS Eydoux and Gervais

*Rhinolophus luctus* varietas *rufa* Eydoux and Gervais, Zool. Voy. 'Favorite,' 1836, p. 9 (Manila, Luzon, P. I.).

This series undoubtedly belongs to the form to which Eydoux and Gervais had reference, although later writers in lack of further specimens have since put the name into synonymy.

*Description.* In general appearance this bat looks like an over-sized somewhat darker example of *Rhinolophus subrufus*. It has two, not very well marked, color phases that to a certain extent may be said to intergrade. In the one the hair is "Vandyke brown" at the tips shading gradually into "avellaneous" at the bases; the soft wavy fur if

ruffled has a silvery tinge when seen in certain lights. The other extreme is a much warmer-colored animal with the tips of the hair "auburn," their bases "ochraceous tawny." The effect is of an ochraceous-tawny bat washed with dark. In both cases the ventral surface is of about the same color as the dorsal, the sparse fur on the throat being a trifle paler. In the brighter-colored individuals, the fur on the throat and below the wings is slightly grayer than on the back. This very large species has nose leaves which in all their details resemble very closely the smaller ones of typical *R. arcuatus*. The horseshoe extends to almost cover the upper lip, the sella is parallel-margined, rounded at the apex, and scarcely expanded at the base; the connecting process, "strongly arcuate," and starting from the very tip of the sella is thinly haired but without a pronounced tuft of hairs at the base as is the case in *R. subrufus*. The ears are moderately large, pointed at the tip, and just below on the outer edge sharply emarginate. Andersen in his paper on *Rhinolophus* (1905, p. 283) emphasizes the importance of the relative lengths of the wing bones. Following his method, I have used a constant figure, 1,000, for length of forearm in all individuals and have set the other measurements in proportion to this. The differences that appear, although so slight as to be of little diagnostic value for ordinary taxonomic work, are interesting in that they show an unusual line of development, particularly in the elongation of the metacarpals and in the proportions of the terminal phalanges of the third digit. Relatively, metacarpals five and three are the most elongated, although three is still shorter than four, with the result that the difference in length between four and five is the same as that between three and four except for a few cases where the two latter approximate each other slightly more closely. This is in direct contrast to the condition that obtains in the rest of the group where four and five are subequal or five very slightly shorter, and three is markedly shorter than four. This development of the metacarpals is associated with a lengthening of the proximal phalanges; in the third finger  $III^1$  is longer in proportion to  $III^2$  than in the rest of the *arcuatus* group. In the latter  $III^2$  is well over one and one half times the length of  $III^1$  while in *rufus* the average is only just one and one half. To a lesser degree  $IV^1$  and  $V^1$  are also elongated. If Andersen is correct in stating that the lengthening of the fifth metacarpal and of  $III^2$  indicates a more advanced stage of development (op. cit., p. 283), then we have here a curious intermediate state in which metacarpal five is rather highly specialized and the phalanges of the third finger retain their more primitive condition.

*Skull.* The skull is very much larger than in any other species of the *arcuatus* group, but is quite similar in proportion. The sagittal crest is keel-shaped and high; anteriorly it divides to form two very pronounced supra-orbital ridges with a deep nasal pit between them. The two median nasal swellings are large and strongly projecting; the lateral ones are not as highly developed as in the *philippinensis* group. The width across the roots of the heavy zygomatic arches is considerably greater than the mastoid width. The palate is short, as is typical for the group, extending from the posterior margin of Pm4/ to the middle of M2/ when measured in the mid-line and is equal in length to between a quarter and a third of the maxillary tooth row. The molariform teeth are rather large and heavy, Pm2/ is small and closely wedged between the canine and Pm4/. Pm3 is minute and peglike, scarcely as high as the cingulum of Pm2/. Pm2/ and Pm4/ are either separated by a slight space or are barely in contact instead of strongly pressed together as is common in other members of this group. The very large size of *rufus* readily separates it from other members of the *arcuatus* group; from *luctus*, the nearest large member of the closely related *philippinensis* group, it may be separated by its shorter palate, larger teeth, slightly lower sagittal crest sloping more gradually anteriorly, its less developed nasal swellings, and by its general lighter, more slender appearance.

*Measurements.* The measurements of three males are given in the following order: M. C. Z. 35092, 35089, 35086; for the five females I have given the two extremes and an average. *External:* total length, male, 111, 114, 119, female, 101-110, 106; tail, male, 29, 30, broken, female 24-33, 28; hind foot, male, 17, 17, 16.5, female, all 17 except one 16.5; ear, male, 31, 34, 32, female, 29-32, 30; forearm, male, 71, 70, 71, female, 67-70, 69; *cranial:* total length, male, broken, 32.3, 33.2, female, 30.7-31.4, 31.1; total length to canine, male, broken, 31.0, 31.7, female, 29.5-30.2, 29.9; basal length, male, broken, 26.2, 26.5, female, 24.4-25.0, 24.7; palatal length, male, 4.0, 3.5, 4.2, female, 3.7-4.0, 3.9; zygomatic width, male, broken, 14.6, 14.7, female, 13.9-14.4, 14.1; mastoid width, male, 13.1, 13.3, 13.7, female, 12.6-13.2, 13.0; width outside molars, male, 11.3, 11.6, 11.5, female, 11.1-11.4, 11.2; length upper cheek teeth, male, 13.1, 13.1, 13.0, female, 12.4-12.5, 12.5; length lower cheek teeth, male, 14.1, 14.2, 14.0, female, 13.4-13.5, 13.4.

Eydoux and Gervais on their voyage around the world in the "Favorite" collected a large leaf-nosed bat in the Philippines which they subsequently described as a variety of *Rhinolophus luctus* Tem-

minck, "Le couleur ordinaire du Rhinolophe Deuil" (*Rhinolophus luctus*) "est d'un brun noir, — mais dans la variété que nous décrivons quoique la feuille soit parfaitement la même le pelage est généralement roussâtre." As no specimens have been recorded since 1836, later writers have generally put it into the synonymy of *luctus*, a large Bornean rhinolophe that has never been reported from the Philippines. Hollister, however (1912, p. 14), felt that the name should be retained until further collections were made, and Andersen, being unable to examine the type, hazarded the guess that the specimen was one of the species later described as *philippinensis*. The rather large series of both species at hand shows *rufus* to be a totally different type of bat. As well as being much larger it has relatively smaller, differently shaped ears and nose leaves. Further, it agrees with the original description in being very like the specimen of *Rhinolophus luctus* figured by Temminck (1841, pl. 30); the size, the pointed, moderately large ears, and the proportions of the nose leaves, except that there are no lateral expansions at the base of the sella, are almost identical. A comparison of this series of *rufus* with three specimens of *luctus* from Mt. Kinabalu, Borneo, shows such a degree of superficial resemblance as to make Eydoux and Gervais' emphasis on their relationship quite understandable. On a more detailed examination, the greater development of the central portion of the nose leaves in *luctus*, the proportions of the metacarpals, as well as those of the phalanges of the third digit, and certain cranial details distinguish these two species so clearly as to put them in separate groups. It is interesting to reestablish beyond any doubt the existence of this species, and to find that it belongs to the *arcuatus* section of *Rhinolophus* of which it is by far the largest member, rather than to the *philippinensis* group as was originally supposed.

*Distribution.* The type comes from Manila; my specimens were caught on Mindoro and Marinduque Islands as indicated above. In neither of the two caves where they were found did they seem particularly rare, possibly because both were remote and seldom visited by the natives. With a greater development of the surrounding country these bats might be driven away; this would explain their never having been retaken on Luzon.

#### RHINOLOPHUS ARCUATUS ARCUATUS Peters

*Rhinolophus arcuatus* Peters, Monatsb. Königl. Preuss. Akad. Wiss. Berlin, for 1871, 1872, p. 305 (Luzon).

This species was so plentiful in the caves where it occurred that I think it curious to have found it only on Mindoro. On that island specimens were caught in two separate caves near Calapan and in the Tabucala Caves on the lower slopes of Mt. Halcon. Hollister (1913, p. 309) reports fifty-seven individuals from various localities in Luzon and one from Mt. Halcon, "Mindanao" (a misprint for Mindoro). Those examined agree in detail with Andersen's description of the species (1905, pp. 281-283), except that he describes the sella as being "ovate" or "ovate-pyriform" whereas I find it to be parallel-margined with an obovate tip. Further, he states (op. cit., p. 287) that in the members of the *arcuatus* group Pm/3 is either situated external to the tooth row or entirely lost. The former obtains for all of my specimens except one where Pm/3 is definitely in the tooth row. Another species of the same size, *R. anderseni* Cabrera, has been described from the Philippines, probably Luzon. Both the external and cranial measurements fall within the limits of variation of *arcuatus* with the exception of those of the last three metacarpals which are shorter in *anderseni* than in the specimens of *arcuatus* that I have measured. As similar measurements taken by Peters in the *arcuatus* group are also slightly less than mine, I do not feel that this constitutes a very good differential character between the species, nor does the slightly lower point of origin for the connecting process of the sella in *anderseni* seem sufficient to separate them. Without examining Cabrera's type it is impossible to say in what relation these forms stand to each other, so until a further comparison of the two it seems best to attribute my entire series to the older described form, *arcuatus*.

#### RHINOLOPHUS ARCUATUS EXIGUUS Andersen

*Rhinolophus arcuatus exiguus* Andersen, Ann. Mag. Nat. Hist., (7), 16, 1905, p. 283 (Zamboanga, Mindanao).

This race is described as differing from typical *arcuatus* only in the narrower horseshoe and nasal swellings. A series of six specimens from Dilirig Caves, Misamis District, Mindanao, collected by L. H. Phillips, agrees perfectly with Andersen's account.

#### RHINOLOPHUS SUBRUFUS SUBRUFUS Andersen

*Rhinolophus subrufus* Andersen, Ann. Mag. Nat. Hist., (7), 16, 1905, p. 283 (Manila, P. I.).

A series of eight specimens, five from Bucay, Abra Province, three from the Tabucala Caves on Mt. Halcon, Mindoro, shows a slight



amount of color variation, although none of them reaches the "cinnamon-rufous" extreme noted by Andersen (op. cit., 284); in the series at hand, the brightest individuals have the hair "pinkish cinnamon" minutely tipped with "cinnamon-brown." In other respects they agree closely with the original description. This is the first time the species has been reported from Mindoro. Previous records include Luzon and Mindanao, although from the latter place they may possibly be referable to the more recently described *Rhinolophus subrufus bunker*i Taylor.

#### RHINOLOPHUS SUBRUFUS BUNKERI Taylor

*Rhinolophus bunker*i Taylor, Monographs of the Bureau of Science, no. 30, Manila, 1934, p. 228 (Saub, Cotabato, Mindanao, P. I.).

Three specimens from Davao probably belong to this race although in various points they differ from Taylor's description, possibly because his account was taken from one specimen only.

*Description.* Forearm measurements of the series from Davao instead of being shorter are slightly longer than in the typical form (*bunker*i, 59.0–59.5, *subrufus*, 54–59, average 56), in the former, also, the lappets of the horseshoe are definitely narrower, and the distribution of fur on the foot is the same in both races. In other respects this series conforms closely to the original description of *bunker*i, and agrees in having the skull slightly more massive than *subrufus* with a greater zygomatic width, although the mastoid width is not noticeably different. The molariform teeth are larger than in *subrufus* while Pm3/ is smaller as viewed from above. The sagittal crest is strong but the supraorbital ridges are obsolescent and there is only a trace of a depression posterior to the nasal swellings, whereas in typical *subrufus* the sagittal crest divides into two pronounced supraorbital ridges that enclose a well-marked nasal pit. In color this race approaches closely the dark phase of *R. rufus*; all three specimens are "Natal brown" with the fur only scarcely paler at the roots and having a very pronounced silvery sheen when viewed in certain lights.

*Measurements.* Measurements of three females are given in the following order: M. C. Z. 35279, 35280, 35281. *External:* total length, 89, 96, 92; tail, 27, 28, 32; hind foot, 16, 16, 16; ear, 24, 25, 26; forearm, 59, 59, 59.5; *cranial:* total length, 26.0, 25.6, 26.9; total length to canine, 24.8, 25.4, 25.3; basal length, 20.5, 21.0, 20.8; palatal length, 2.9, 3.0, 3.2; zygomatic width, 12.6, 13.3, 13.0; mastoid width, 11.4, 11.7, 11.7; width outside molars, 10.0, 10.0, 10.4; length upper cheek teeth, 10.1, 10.0, 10.5; length lower cheek teeth, 11.1, 11.0, 11.4.



The difference in color, large foot, large molariform teeth, and absence of a post-nasal depression readily distinguish this form from the closely related *R. subrufus*. However, the size, the general shape of the skull, and the proportions of the wing bones are too similar to warrant its recognition as a full species. A much more accurate idea of its relationship to the other Philippine rhinolophes is obtained by considering it a race of *subrufus*. At present it is recorded from the Cotabato Coast, Mindanao, only; my three specimens come from near Davao, and Taylor's from Saub.

## FAMILY HIPPOSIDERIDAE. HORSESHOE BATS

### HIPPOSIDEROS DIADEMA GRISEUS (Meyen)

*Rhinolophus griseus* F. J. F. Meyen, Nov. Acta Acad. Caes. Leop.-Carol., 16: pt. 2, 1833, p. 608 (San Matheo Cave, Luzon, P. I.).

The Philippine bats of the *Hipposideros diadema* group are so variable as to make their identification very difficult. Andersen (1905, p. 497) calls his series of eight adult and five young specimens from Luzon, Catanduanes, Leyte, and Mindanao all *H. d. griseus*, although he remarks that one exceptionally small individual may be a distinct species. If this were the case, we would have the same situation that occurs in the genus *Rhinolophus*, where species distinguishable principally on the basis of size occur in the same territory. Taylor (1934, p. 246), with six specimens from various localities in Luzon and twenty from Mindanao, apparently decides that the least of his series, an individual from Rizal Province, Luzon, is enough smaller than the others to be worth describing. Except for a slightly narrower horseshoe, the difference is entirely one of size. Careful examination of a series of six specimens from Cebu, seven from Mindoro, one from Luzon, and one from Mindanao, shows that there is no sharp differentiation between the larger and the smaller ones. One female from Mindoro is as small as the type of *H. d. anderseni*, with the skull and tooth rows even shorter; a male from the same place is only slightly larger and there is a progressive increase in size from these to the largest which are as large as the biggest of Andersen's series. When the series from Cebu and Mindoro are compared, it becomes apparent that those from Cebu average slightly larger; however, the species is too variable and the measurements of both series overlap too much to make any subdivision reasonable. It is altogether possible that colonies on different islands may tend to vary in size but the dif-

ferences are not well enough marked to do more than confuse the distributional picture, if an attempt is made to recognize them with distinct names. It is interesting to note that the tendency of *H. diadema* in the Philippines is not to divide into larger and smaller races, with similar ranges as both Andersen and Taylor supposed, but to split up locally into subspecies separated by some natural barrier.

*Measurements.* Measurements of Mindoro specimens are given as follows: extremes and average for four males, the same for three females. *External:* Total length, male, 127-135, 132, female, 125-136, 130; tail, male, 43-46, 45, female, 36-46, 41; hind foot, male, all 17, female, all 17; ear, male, 25-27, 26, female, 23-26, 25; forearm, male, 79-83, 81, female, 76-80, 78; *cranial:* total length, male, 30.2-31.0, 30.7, female, br., 28.7, 29.3; total length to canine, male, 29.6-30.8, 30.1, female, 28.6-29.0, 28.8; basal length to canine, male, 23.9-24.7, 24.3, female, 23.1-23.5, 23.3; palatal length, male, 4.4-5.0, 4.7, female, 4.0-4.5, 4.3; zygomatic width, 16.0-16.4, 16.2, female, 15.9-16.4, 16.2; mastoid width, 13.8-14.2, 14.1, female, br., 13.7, 14.0; width outside molars, male, 10.8-11.4, 11.1, female, 10.9-11.4, 11.1; length upper cheek teeth, male, 11.8-12.1, 11.9, female, 11.4-11.5, 11.5; length lower cheek teeth, male, 13.1-13.5, 13.3, female, 12.7-12.8, 12.8.

Measurements of Cebu specimens are given as follows: two males, extremes and average for four females. *External:* total length, male, 140, 146, female, 139-143, 141; tail, male, 48, 53, female, 47-56, 51; hind foot, male, 17, 18, female, 17-18, 18; ear, male, 24, 27, female, all 28; forearm, male, 88, 85, female, 83-86, 84; *cranial:* total length, male, 31.5, 31.2, female, 30.9-31.4, 31.1; total length to canine, male, 31.3, 31.0, female, 30.2-30.7, 30.5; basal length, male, 25.0, 24.8, female, 24.1-24.8, 24.5; palatal length, male, 4.8, 5.1, female, 4.7-5.2, 5.0; zygomatic width, male, 17.7, 16.5, female, 17.0-17.5, 17.2; mastoid width, male, 14.5, 14.3, female, 14.1-14.5, 14.3; width outside molars, male, 12.2, 11.3, female, 11.2-11.9, 11.5; length upper cheek teeth, male, 12.6, 12.2, female, 11.9-12.2, 12.0; length lower cheek teeth, male, 14.3, 13.6, female, 13.1-13.6, 13.4.

#### HIPPOSIDEROS BICOLOR ANTRICOLA (Peters)

*Phyllorhina antricola* Peters, Monatsb. Königl. Preuss. Akad. Wiss. Berlin, for 1861, 1862, p. 709 (Paracali, Luzon, P. I.).

Study of our long series of *Hipposideros* shows conclusively that the form of *bicolor* found in the Philippines is a valid race and easily distinguished from the typical one described by Temminck.

*Description.* Tips of the hairs on the back for a quarter to a third of their length range from "vandyke brown" to "auburn" while the bases are pure white. On the ventral surface the tips of the hairs are "snuff brown" to "wood brown," darkest along the sides of the belly; the bases are only slightly paler. One example of typical *bicolor* from Java when compared with this series has the tips of the hairs as pale as the palest of the Philippine ones and the bases are white for at least three-quarters of their length; the hair on the ventral surface is sharply bicolored, the "avellaneous" tips contrasting strongly with the pale "tilleul buff" bases. In *antricola* the shape of the nose leaf is also very distinctive: the upper end of the septum is expanded and bulbous and the margins of the horseshoe extend inward so as to conceal the nostrils.

*Skull.* In size, shape, and general proportions, skulls of *antricola* are very close to those of typical *bicolor*. In the former, however, Pm2/ is smaller and is either closely wedged in between the canine and Pm4/ or forced out to the side of the tooth row so that these two teeth are almost in contact. A further difference lies in the much greater development of the heel of Pm4/ in *bicolor* as compared to the condition that obtains in *antricola*; in the former this is equal in bulk to about half the protocone and projects backward and inward in a strong semicircular curve, whereas in *antricola* it is reduced to a narrow ledge widening slightly behind the protocone.

Peters' brief description of this race, although it contains no notes on the skull and little of significance on the color, includes a list of measurements which, from the shortness of the ear ("17" mm.) and the tibia ("16.5" mm.) enable us to identify his race as the local form of *H. bicolor*. Dobson (1878, p. 151), after examining a single specimen from Luzon, puts *antricola* into the synonymy of *bicolor*. Matschie (1898, p. 39) with a series of six specimens available from Manila uses the name *antricola*, and Hollister (1912, p. 15) on the strength of records from Peters and Elera for *bicolor* and Matschie for *antricola* records both as species from the Philippines although subsequently (1913, p. 309) he identifies the two specimens in the U. S. National Museum as the latter. Actually, one at least of these specimens, U. S. National Museum 101969 from Luzon, belongs without question to the long-eared species described below and is very distinct from the shorter-eared type of bat to which the name *b. antricola* must be applied. Taylor (1934, p. 237) recognizes the existence of a distinct race of *bicolor* in the Philippines but, assuming that *antricola* should go to the long-eared group, redescribes it as *H. bicolor wrighti*. Taylor's measure-

ments conform very closely to Peters' for *antricola*, particularly in the diagnostically important short ears and tibia (op. cit., p. 238; ear, 17.5, tibia, 17), so that *wrighti* is entirely applicable to the series of *antricola* at hand. The presence of a small triangular leaflet in front of the small, nearly obsolete, frontal pore mentioned by Taylor as characteristic of *wrighti* is variable. In the one alcoholic specimen that I have at hand this leaflet is absent, while in some of the dried skins it is noticeably present as it is in the dried skin of *bicolor*. Taylor also states that *wrighti* has a "short body and shorter tail" than *bicolor*, a difference that I find to be only very slight. The M. C. Z. series of nine individuals taken on three different islands helps to establish this race as a rather common, fairly wide-ranging member of the genus.

*Distribution.* The records from Mindoro and Marinduque are new; previously it has been reported from Luzon, and Hollister (1913, p. 309) reports a specimen from Mindanao which may belong to this species.

#### HIPPOSIDEROS ERIGENS spec. nov.

*Type.* An adult male, skin and skull, Museum of Comparative Zoölogy no. 35197, from the lower slopes of Mt. Halcon, northern side, near Calapan, Mindoro, P. I., collected 7 March, 1937, by Barbara Lawrence.

*Description.* The small bicolored bats of this genus show very little variation in color. This particular species only differs from the preceding in its paler ventral surface, where the bases of the hairs are white, the tips "drab" slightly washed with whitish. Two other specimens from the same locality are as dark as the type, a third has the tips of the hairs on the belly only faintly tinged with "tillend-buff" deepening to "vinaceous-buff" laterally. The length of the forearm and of the hind foot fall within the limits of variation for *antricola*; however, the tibia is noticeably longer and the ears are larger in *erigens*. The noseleaf is larger than that of *antricola*, but as the shape and proportions are the same the difference appears less significant from measurements than it does to the naked eye. A further difference lies in the shape of the septum, which in *erigens* is wedge-shaped with the broad end more ventral, and there is no expansion of the inner margin of the horseshoe, so that the oval nostrils are clearly visible.

*Skull.* The skull is larger than that of *antricola* with a more pronounced sagittal crest, although the braincase itself is scarcely as deep; the lengthening of the skull shows particularly in the greater distance from the interorbital constriction to the front of the canine in *erigens*. The nasal swellings are also noticeably higher, the ear-bones

especially the bullae are larger. The upper and lower tooth rows are longer with a proportional increase in individual tooth size. Pm2/ is a well-developed tooth with a definite cingulum and a cusp that is higher than the cingulum of Pm4/. This is in sharp contrast with the condition that obtains in *antricola* where Pm2/ is a very much lower, peg-like tooth with, in some few cases, barely a trace of a cingulum.

*Measurements.* Measurements are given in the following order, two males 35197 and 35196, the type first, and two females 35195 and 35198. *External:* total length, 73, 75, 75, 80; tail, 26, 28.5, 28, 31; hind foot, 8, 9, 9, 8; ear, 21, 19, 19, 21; forearm, 42, 41, 43, 43; proximal end of tibia to tip of claws, taken on dried specimen, 26.0, 26.0, 26.4, 26.7; *cranial:* total length, broken, 17.8, 17.7, 18.3; total length to canine, broken, 17.7, 17.3, 18.0; basal length, 14.0, broken, 13.4, 14.0; palatal length 2.7, 2.6, 2.7, 2.7; zygomatic width, 8.7, 8.7, 8.6, 8.8; mastoid width, 8.9, broken, 9.0, 9.0; width outside molars, 6.0, 5.7, 6.0, 6.1; length upper cheek teeth, 6.2, 6.0, 5.9, 6.2; length lower cheek teeth, 6.4, 6.2, 6.2, 6.5.

Individuals of this species all taken from the same place agree in essential detail, and are most easily separated from specimens of *antricola* on the basis of their skull characters, although the larger ears, longer tibiae and differently shaped nasal appendages, are also important. These differences together with the fact that both forms seem to inhabit the same territory without interbreeding make it advisable to recognize *erigens* as a full species instead of a rather aberrant local development of the *bicolor* group. The two species appear to hang up in separate caves. In the large Tabucala Cave I found a great number of *erigens*. In the small one, as well as in some caves at Calapan on the coast, only *antricola* was taken.

*Hipposideros pygmaeus* is a third small member of the genus found in the Philippines that may be distinguished from the above two species by its smaller size; the tibiae are short, and the wing bones very slender, the forearm although actually short is longer in proportion to the other external measurements and this might conceivably lead the casual observer to confuse this form with the larger ones. Unfortunately I did not secure any specimens of *pygmaeus* myself, but the above notes were taken from specimens in the U. S. National Museum.

*Distribution:* Individuals referable to this new species include a long series from Luzon in the U. S. National Museum. It is possible that some specimens previously attributed to *antricola* may belong to this species.



## FAMILY VESPERTILIONIDAE. SIMPLE-NOSED BATS

## MYOTIS MACROTARSUS (Waterhouse)

*Vespertilio macrotarsus* Waterhouse, Proc. Zool. Soc. London, **13**, 1845, p. 3 (Philippine Islands).

Scattered records of this species have come from Luzon, Mindanao, Mindoro and Tawi Tawi; in each case they involve only one or two individuals. This series of twelve from the same cave on Marinduque adds to the list another island well within the expected range of occurrence. It also is interesting evidence that these little bats are not solitary but hang up in colonies in caves. The cave where these were collected was rather deep with a low ceiling and was a short distance from the sea shore.

Dobson (1878, p. 290) published a good account of the species to which Taylor added (1934, p. 281). Both had only alcoholic material and so were unable to give an adequate color description. In the specimens at hand the hair on the back is bicolored, the "buffy brown" tips almost entirely concealing the dark "mummy brown" bases. On the under side only the extreme bases of the hairs are dark, "bister," the tips, which give the characteristic color to the fur, being "cinnamon buff." This shade is brightest on the cheeks and chin where the hair is the same color throughout and on the throat where the dark bases begin to appear. There is a certain inconsiderable variation from a more gray to a more ochraceous tint in the tips of the hair.

## SCOTOPHILUS TEMMINCKII (Horsfield)

*Vespertilio temminckii* Horsfield, Zoological Researches in Java: 1824 (Java).

The type locality of this species is Java where it is found in association with a race of the *castaneus* group described by Sody (1936, p. 49) as *solutatus*. It is interesting to note that all of the many Philippine records for *Scotophilus* appear to be for *temminckii*, which may be distinguished from *S. castaneus solutatus* by its smaller size, shorter forearm, smaller foot, ear and tragus as well as tail in which the individual vertebrae are noticeably very short. Of a series of six *S. castaneus solutatus* from Java three are dark, about "Prout's brown," two brilliant "burnt sienna" and one intermediate. The dark ones have the back washed with gold and the belly shiny "mustard yellow," brighter at the sides. Specimens of *temminckii*, on the other hand, from both Java and the Philippines have no trace of a golden sheen either dorsally or



ventrally. In a curious way this parallels the situation found here in New England where *Myotis lucifugus* and *Myotis sodalis* are practically the same size and very similar in color, only the one has very brassy looking tips on the hairs and the other is dull. Eleven specimens of *temminckii* from the Philippines are "cinnamon brown" above and "wood brown" to "vinaceous buff" below, very much as are the five Javanese ones. Extreme individuals of the former series are paler than any of those of the latter, but they intergrade very thoroughly and there is little size variation except for one exceptionally large female from Calapan that has a forearm measurement of 53.5. The series of *temminckii* from Java are slightly smaller than the measurements published for the species by Dobson (1878, p. 259), with the exception of the single large female mentioned above. Forearm measurements of the Philippine series range from 48 to 50 mm.

Four of the specimens at hand come from Mindoro Island and two from Cebu. This species has not previously been reported from either of these islands, although it is a common bat widespread in the Philippines. The rest of the series comes from Abra Province, Luzon.

#### MINIOPTERUS PAULULUS Hollister

*Miniopterus paululus* Hollister, Proc. U. S. Nat. Mus., **46**, 31 Dec. 1913, p. 311 (Guimaras, P. I.).

The smallest Philippine member of the genus *Miniopterus* is recognized as a distinct species and separated from *pusillus* and *australis* principally on the basis of size. A long series of alcoholic specimens as well as twenty-five skins and skulls agree with Hollister's description. Forearm lengths of the skins range from 35 to 38 mm., which is slightly larger than the average for the type series. However, there is no localizing of larger or smaller individuals and the range of variation for each colony comes close to the maximum. A comparison of the skins with a series of *australis* from New South Wales shows a certain average color difference between the two; the Philippine specimens tend to be darker particularly at the base of the hairs. In some of the Australian skins, the head is slightly paler than the lower back, a difference that none of the Philippine specimens shows. Also in the Philippine series the red phase is more richly colored and the percentage of these bright individuals is greater. Cranially, *paululus* is distinguishable by its noticeably smaller skull with a lower braincase and somewhat less projecting bullae.

The type and paratypes of this species come from Guimaras; Taylor

records three specimens from Luzon, and the series at hand adds the following islands to the list: Mindoro, where two were found with *eschscholtzii* in caves near Calapan and a large number in the caves on the lower slopes of Mt. Halcon; Marinduque and Mactan, where both species were taken in the same caves, *paululus* predominating. A few specimens come from Abra Province and one is from Baguio in the Mountain Provinces of Luzon. Without going over the actual material attributed to *australis* and *pusillus* it is impossible to pass on the accuracy of their identification; possibly certain of the Philippine records for both species should be considered *paululus* and a few of those for *pusillus* in reality may refer to *eschscholtzii*.

#### MINIOPTERUS ESCHSCHOLTZII (Waterhouse)

*Vespertilio eschscholtzii* Waterhouse, Proc. Zool. Soc. London, **13**, 1845, p. 3 (Philippine Islands).

Hollister (1913, p. 311) believes that the Philippine medium-sized *Miniopterus* is distinct enough from the European *schreibersii* to warrant specific recognition, and revives the name which Waterhouse originally applied to some of Mr. Cumings' specimens from the Philippines. Taylor (1934, p. 272) follows Hollister, although a comparison of his specimens from Zamboanga and Tablas with Waterhouse's account raised some doubt in his mind as to whether they actually were the species to which the original description had reference, particularly as his individuals lack the naked groove which, according to this account "runs over the eye." This groove is lacking in my specimens also, and, as no mention is made of a very marked groove running below the eye, I think it highly probable that it is the latter which Waterhouse had in mind. The measurements of the type are clearly those of one of the medium-sized members of the genus which, I believe, in the Philippine Islands all belong to the same race. If this is the case, there should be no difficulty about the use of the name *eschscholtzii* for this group in spite of the rather general type locality.

The material at hand includes long series from near Calapan, Mindoro; a few from near Torrijos, Marinduque Island, and from Mactan Island across the channel from Cebu; also a long series from the Misamis district on Mindanao. This extends their known range westerly and adds several islands to the list of localities where they have been taken; these included Luzon, Samar, Guimaras, Mindanao and Tablas.

## MINIOPTERUS TRISTIS (Waterhouse)

*Vespertilio tristis* Waterhouse, Proc. Zool. Soc. London, **13**, 1845, p. 3 (Philippine Islands).

One alcoholic specimen from Calapan on Mindoro was sent to the Museum of Comparative Zoölogy by Pedro de Mesa. Although I subsequently took long series of the smaller species of *Miniopterus* from caves near this town, presumably the same ones where de Mesa collected, I caught none of this largest form. It is evidently considerably more rare than either of the other species from which it may readily be distinguished by its much larger size. Hollister gives the forearm length for a single specimen from Lubang Island as 51.9 mm., the one at hand measures 52.8 mm.

## FAMILY MOLOSSIDAE. FREE-TAILED BATS

## CHIAEREPHON LUZONUS Hollister

*Chaerephon luzonus* Hollister, Proc. U. S. Nat. Mus., **45**, 31 Dec. 1913, p. 312 (Cagayan, Cagayan Province, Luzon).

A good series of both alcoholics and skins and skulls agrees with Hollister's description of the type in being paler and smaller than *C. plicatus* (Buchanan). Comparison of the series at hand with a good series of *plicatus* from Java shows that the difference in length of forearm in the two species is more pronounced than the difference in foot length. The specimens all came from the Montalban Caves near Manila. Taylor (1934, p. 311) lists a long series collected in the same place, stating that this species was the most numerous when he collected there. This was also the case when I visited the caves.

## CHEIROMELES PARVIDENS Miller and Hollister

*Cheiromeles parvidens* Miller and Hollister, Proc. Biol. Soc. Washington, **34**, 20 June, 1921, p. 100 (Pinadapa, Middle Celebes).

Although only one specimen of *Cheiromeles* was taken in the Philippines, there seems to be little doubt that it is much more closely related to the small Celebean *Cheiromeles parvidens* than to the larger *C. torquatus* of Java and Borneo. Comparison of Miller and Hollister's type with the specimen at hand from Bignay, Mt. Halcon, Mindoro, shows the very sparse fur on the under surface, and around the sides of the face and the base of the tail, as well as the "brush" on the first toe to be a redder brown than in the Celebean specimen. In all other

respects, external measurements, size of the skull and length of the tooth rows, there is little to choose between the two individuals. Compared with a specimen from Borneo the difference in size with the disproportionately smaller teeth described as characteristic for *parvidens* holds true for the Mindoro individual as well. Taylor (1934, p. 321), who published the first record for this genus from the Philippines, lists four specimens from Saub, Catabato, Mindanao, as *C. torquatus* and gives measurements that come very close to those of the Mindoro individual and are decidedly less than those of the Bornean one. Only these five specimens have been recorded from the Philippines. The one from Mindoro was shot while flying at dusk. The others Taylor states (op. cit., p. 323) were found in a hollow tree.

#### FAMILY GALEOPTERIDAE. FLYING LEMURS

##### CYNOCEPHALUS VOLANS (Linnaeus)

*Lemur volans* Linnaeus, Syst. Nat., ed. 10, 1, 1758, p. 30 (Pampanga, southern Luzon, P. I.).

One young male, skull only, was collected at Davao on Mindanao.

#### FAMILY TARSIIDAE. TARSIIERS

##### TARSIVS CARBONARIUS Heude

*Tarsivus carbonarius* Heude, Mém. Hist. Nat. Emp. Chinois, 4, pt. 4, 1899, p. 164 (Gulf of Davao, Mindanao, P. I.).

A single specimen probably referable to this species, was collected on Basilan near Lamitan. I have been unable to find any previous records for the genus from this island.

#### FAMILY CERCOPITHECIDAE. Macaques

##### MACACA PHILIPPINENSIS (Is. Geoffroy)

*Macacus philippinensis* Is. Geoffroy, Arch. Mus. d'Hist. Nat. Paris, 2, 1841, p. 568 (Philippine Islands [purchased in Manila]).

This species is represented in the collection by a young male and a somewhat older female from Lagangilang, Abra Province, Luzon.

## MACACA MINDORA (Hollister)

*Pithecus mindorus* Hollister, Proc. U.S. Nat. Mus., 46, 31 Dec. 1913, p. 328  
(Alag River, Mindoro, P. I.).

Three specimens were caught at Pinamalayan, and one at Pola, Pasi, on Mindoro. A young female of this series, when compared with a slightly older female from Lagangilang, Abra Province, agrees with Hollister's description in being more richly colored and in having a wide shallow palate.

## FAMILY MUSTELIDAE. WEASELS, MARTENS, ETC.

## SUILLLOTAXUS gen. nov.

Type species *Mydaus marchei* Huet.

*Characters.* The hog badgers of the East Indian region fall into two well-defined groups which, although obviously closely related, have such a divergent pattern of development as to make their separation much more nearly a generic than a specific one. *Mydaus*, originally given by Cuvier to the Javanese animal, should be retained for the small-toothed, longer-tailed ones from Java, Sumatra, Borneo and the Natuna Islands. For the broad-toothed, short-tailed form from Palawan and the Calamianes Islands in the Philippines I propose *Suillotaxus*. Externally this genus may be distinguished by its vestigial, very thinly haired tail, referred to by Huet in his original description of *marchei* as "tubercule sans poils," and by the reduction of the external ear. The color and distribution of the hair, although more truly specific characters, are also quite different in the two genera. In *Mydaus* there is a pronounced white patch on the head which extends in a line of varying width down the back, it may be broadly continuous on the tail which is always white tipped, or it may be interrupted for a short space in the middle of the back. In *Suillotaxus* there is only a scattering of silvery hairs over the back, sometimes concentrated on the top of the head.

*Cranial characters.* The size of the teeth, the number of cusps on the fourth upper premolar and the shape of the bony meatus of the ear are the most distinctive features. In general proportion the skulls of *Mydaus* and *Suillotaxus* are not strikingly different. *Mydaus* has the palate longer with the premaxillary portion of the skull drawn out so that the nasal aperture slopes backwards and appears more excavated than in *Suillotaxus*. The auditory meatus in *Mydaus* is elongated into

a funnel-shaped projection which appears almost as large as the bulla itself. This is a very curious development and quite different from the relatively shorter tubular opening found in *Suillotaxus*. The tooth formula is the same in both genera:

$$I \frac{3}{3}, C \frac{1}{1}, Pm \frac{3}{4}, M \frac{1}{1}$$

but *Suillotaxus* has the teeth much heavier than *Mydaus*. Pm2/ in the latter is much flattened with a single bladelike cusp and a faint indication of a talon; in *Suillotaxus* the cusp is peg-like with a broad solid base and the tip drawn into a point; there is a distinct talon which is continued internally around the base of the posterior root in a slight cingulum. Pm4/ in *Mydaus* has two external cusps separated by a deep notch; the anterior one is as high as Pm2/, the posterior one as M1/; together they form a flattened delicate outer margin which is separated by a deep hollow from the ridge along the inner margin, all that remains of the inner cusp. The single outer cusp of Pm4/ in *Suillotaxus*, placed more antero-centrally than laterally, is triangular in profile and widens internally at the base to include one half to two thirds of the tooth; there is a slight but well-defined cusp on the postero-internal side. In the region of Pm4/ the axis of the tooth row is slanted diagonally outwards, probably because the alveolar margin spreads widely at the root of the zygoma in order to accommodate the greatly increased bulk of the last molar. M1/ in *Mydaus* is small, only slightly larger than Pm4/; the outer cusps are low and the inner one is scarcely more than a ridge separating the bulk of the tooth from the narrow heel. In *Suillotaxus* M1/ is almost twice as large as Pm4/, the inner cusp is almost equal in bulk to the postero-external one and the talon forms a low, wide shelf projecting from the inner and posterior margins of the tooth so far that a line from the inner cusp to the notch on the posterior margin divides the tooth in halves. The teeth in the lower jaw also, with the exception of M/2, are broader and the cusps heavier in *Suillotaxus*, Pm/1 instead of being peg-like is elongated antero-posteriorly, Pm/2 and Pm/3 have a low cingulum on the inner side that forms a slight cusp anteriorly when seen in profile and a pronounced heel posteriorly. In *Mydaus* there is no cingulum on these premolars and only a trace of a heel. Pm/4 in *Suillotaxus* is a large heavy tooth with all three cusps about equal in size whereas in *Mydaus* the tooth is much smaller and the outer cusp is so flattened on top as to be scarcely higher than the talon. In both genera M/2 is about the same size.



Since Cuvier's description of *Mydaus* in 1821, later writers have confined themselves almost entirely to a study of the inter-relationships of the various races and to notes on their habits. The Philippine animal was first described by Huet (1887, p. 149) from a specimen from Palawan which he called *Mydaus marchei*. He mentions particularly the very short tail and the absence of a white line on the back. Jentink (1895, p. 46) describes another form, *schladenbergi* from the Calamianes Islands, P. I., and calls attention to the unusually large molari-form teeth, especially Pm/4 in the Philippine animals as compared to specimens from Java and Borneo. His early remarks on the very pronounced differences between the Calamianes Island animal and those from Java, Borneo and Sumatra are amply verified in this further comparison of individuals from the two areas. The sturdy type of dentition that is found in *Suillotaxus* with strong cusps and ridges on the large teeth has little in common with the much less powerful dentition of *Mydaus* where the cusps are thin and bladelike, an adaption for cutting which is further evidenced by the presence of two cusps instead of one on the outer side of Pm4/; this together with the development of the ear bones, the larger external ear and the longer tail in *Mydaus* points to a progressively different line of development in both genera rather than the isolation of the Bornean type of animal on Palawan and the adjacent islands and its subsequent differentiation.

#### SUILLOTAXUS MARCHEI (Huet)

*Mydaus marchei* Huet, Le Naturaliste, II, 9<sup>e</sup> année, 13, 15 September 1887, p. 149 (Palawan).

This species is represented by a single specimen from Puerto Princesa, Palawan. An additional specimen in the U. S. National Museum taken at Iwahig on the same island was also examined.

### FAMILY VIVERRIDAE. CIVETS

#### PARADOXURUS PHILIPPINENSIS Jourdan

*Paradoxurus philippinensis* Jourdan, Compt. Rend. Acad. Sci. Paris, 5, 1837, p. 523 (Philippine Islands, Luzon and Mindanao).

This species is represented in the collection by three specimens from Puerto Princesa and one from Brooke's Point on Palawan; by a specimen from Baguio, Mountain Provinces, and one from Bangued, Abra Province, on Luzon and by one from Maluso on Basilan. The Palawan

animals show considerable color variation with more or less dark on the center and lower back and the sides more or less washed with golden ochraceous. In all of them the three shadow stripes in the center of the back are faintly traceable while in the Luzon individuals, which are younger, there is no tendency for the dark area to fall into any pattern of stripes or spots.

#### VIVERRA TANGALUNGA Gray

*Viverra tangalunga* Gray, Proc. Zool. Soc. London, 1832, part 2, p. 63 (type locality not given).

Hollister (1913, p. 313) states that comparison of six specimens from the Philippines with a series of sixty from Sumatra, Borneo and the smaller Malayan Islands shows not the slightest constant character to allow for subdividing them. The two specimens at hand came from Palawan, and Lagangilang, Abra Province, Luzon.

#### ARCTICTIS WHITEI Allen

*Arctictis whitei* Allen, Bull. Amer. Mus. Nat. Hist., 28, 29 Jan. 1910, p. 15 (Iwahig Penal Colony, Palawan).

Few individuals of this species have been recorded. The original description refers to four specimens from Iwahig. This additional example is a subadult male taken near Brooke's Point on the southeast coast of Palawan.

### FAMILY SCIURIDAE. SQUIRRELS

#### NANNOSCIURUS CONCINNUS (Thomas)

*Sciurus concinnus* Thomas, Ann. Mag. Nat. Hist., (6), 2, 1888, p. 407 (Isabela, Basilan, Philippines).

*Description.* Six of the seven skulls examined have a small upper Pm3, the absence of which in the type Thomas considered important in separating his new species. In the seventh skull there are only four molariform teeth, but it is possible that the first is only a milk tooth, and might later have been replaced by a small Pm3 as well as Pm4. Although, in this respect, my series does not agree with Thomas's description, there can be no doubt that *N. concinnus* is a valid species which may readily be separated from *Nannosciurus exilis* by its larger size, bigger hind foot and longer, bushier tail. The shape of the posterior sole-pad is difficult to make out in dried specimens, but, as Thomas notes, the hair on the sole extends much farther towards the

toes in *exilis* than it does in *concinus*; in the former it is some shade of buff, while in the latter it is grizzled like the upper surface of the foot. Also the more uniformly colored back and tail in *N. concinns* serve to distinguish the two.

The single specimen that Taylor (1934, p. 370) collected, was the only one he saw in one and one half months' collecting on the island. In the partially cleared places where lumbering had been carried on, I found them rather common and not particularly shy. Their habit of running along fallen logs and whisking in and out of holes is very reminiscent of chipmunks. This species appears to be limited to Basilan. Various other forms, probably closely related, have been described from the nearby islands (Taylor, 1934, p. 368).

#### TOMEUTES PHILIPPINENSIS (Waterhouse)

*Sciurus philippinensis* Waterhouse, Proc. Zool. Soc. London, 7, 1839, p. 117 (Philippine Islands).

Both *S. mindanensis* and *S. philippinensis* have been reported as occurring on Basilan as well as on Mindanao. The series at hand of four specimens from near Maluso, Basilan, shows little variation in color and represents obviously only one species. In the absence of sufficient comparative material it is impossible to determine just how the two above-mentioned species differ, so I have followed Hollister (1913, p. 314) who calls the Basilan animal *philippinensis*.

### FAMILY PETAURISTIDAE. FLYING SQUIRRELS

#### PTEROMYS (PETINOMYS) CRINITUS (Hollister)

*Sciuropterus crinitus* Hollister, Proc. Biol. Soc. Washington, 24, 23 June 1911, p. 185 (Basilan Island, P. I.).

One adult male from near Maluso, Basilan, agrees with Hollister's description of the type, which I have been unable to examine. This is the second specimen to be recorded and was brought in alive by natives who caught it as it escaped from a felled tree.

### FAMILY MURIDAE. TYPICAL RATS AND MICE

#### PHLOEOMYS PALLIDUS Nehring

*Phloeomys pallidus* Nehring, Sitz.-ber. Ges. Nat. Freunde Berlin, no. 6, 17 June 1890, p. 106 (Luzon).

Two species of *Phlocomys* have been reported from northern Luzon: *P. pallidus* which Thomas says differs from the second one, *P. cumingi*, by its "larger size, longer and much softer fur and paler colour" (1896, p. 400). Hollister (1913, p. 315) calls all three specimens in the U. S. National Museum *pallidus*. Measurements of the single specimen at hand caught near Baguio are almost identical with those that he publishes for one from Hights-in-the-Oaks also in the Mountain Provinces.

#### RATTUS BASILANUS (Hollister)

*Mus basilanus* Hollister, Proc. U. S. Nat. Mus., **46**, 31 Dec. 1913, p. 322 (Basilan Island, P. I.).

On Basilan a series of five specimens was caught in livetraps set along the edge of a rubber plantation. On Mindanao, near Zamboanga, one adult and two young specimens were caught under piles of debris in a coconut plantation; the adult is very like the series from Basilan with no noticeable size difference. Hollister in his original description of the latter notes particularly that *basilanus* is smaller than *R. todayensis* Mearns (1905, p. 445). None of his comparative material comes from Zamboanga and it is likely that the lowland form there is actually the same as the one on Basilan Island and that *todayensis* should only apply to the form found in the eastern part of Mindanao.

#### RATTUS CALCIS (Hollister)

*Epimys calcis* Hollister, Proc. Biol. Soc. Washington, **24**, 15 May 1911, p. 89 (Baguio, Benguet Province, Luzon, P. I.).

Four specimens were taken near Baguio in the Mountain Provinces. Although the difference in color, when this series is compared with a single specimen of *querceti* from Abra Province, is not as pronounced as the original description indicates, the larger size of the latter, especially the longer and more heavily ridged skull, and the harsh spiny fur, easily distinguish it.

#### RATTUS EVERETTI (Günther)

*Mus everetti* Günther, Proc. Zool. Soc. London, 1879, p. 75 (type locality probably Dinagat or Mindanao [Taylor, 1934, p. 419]).

Four rats belonging to the group with bicolored tails were taken near Baguio and are all called *everetti*. Thomas (1895, p. 163) distinguishes a second species of half white-tailed rat, *Mus luzonicus*, of the same size as *everetti* with longer fur, shorter tail and differing

slightly in certain details of the skull. Hollister (1913, p. 324) puts this into the genus *Bullimus* of Mearns. Although two of the individuals examined have the shorter tail and slightly smaller bullae mentioned by Thomas as typical of *luzonicus*, the other cranial characters are too intermediate to be diagnostic.

#### RATTUS MINDANENSIS MINDANENSIS (Mearns)

*Mus mindanensis* Mearns, Proc. U. S. Nat. Mus., **28**, 1905, p. 442 (Todaya, Mt. Apo, Mindanao).

This species is represented by three specimens from Baguio in the Mountain Provinces and two from Lagangilang, Abra Province, both on Luzon.

#### RATTUS QUERCETI (Hollister)

*Epimys querceti* Hollister, Proc. Biol. Soc. Washington, **24**, 15 May 1911, p. 90 (Hights-in-the-Oaks, Benguet Province, Luzon, P. I.).

This species is represented in the collection by a single specimen from Lagangilang, Abra Province, Luzon.

#### RATTUS DATAE (Meyer)

*Mus datae* Meyer, Abhandl. und Berichte der Königl. Zool. Mus. Dresden, **7**, no. 7, 1899, p. 25 (Mt. Data, Luzon, P. I.).

Two specimens from Baguio in the Mountain Provinces have the under surface pale grayish white with no trace of the "naphthaline yellow wash" mentioned by Hollister (1913, p. 323) as typical of *datae*. The contrast between this and the buff verging on ochraceous of the under surface in the type of *benguetensis* is very pronounced.

#### CRATEROMYS SCHADENBERGI (Meyer)

*Phloeomys* (?) *schadenbergi* Meyer, Abhandl. und Berichte der Königl. Zool. Mus. Dresden, **5**, no. 6, 1895, p. 1 (Mt. Data, Luzon).

The single specimen in the collection is of the very dark variety and was brought in alive by the Igorots. I saw a second very much paler one that was being kept as a pet.

#### APOMYS MAJOR Miller

*Aponys major* Miller, Proc. U. S. Nat. Mus., **38**, 1911, p. 402 (Hights-in-the-Oaks, Benguet, Luzon, P. I.).

Two examples of this species were taken near Baguio, Mountain Provinces, Luzon.

## FAMILY MANIDAE. PANGOLINS

## PARAMANIS CULIONENSIS (Casto de Elera)

*Pholidotus culionensis* Casto de Elera, Contribución a la Fauna Filipina, Manila, Colegio de Santo Tomás, 1915, p. 274 (Culion Island).

*Description.* Three pangolins from Puerto Princesa, Palawan Island, agree in almost every detail with Fr. Casto de Elera's description of the external characters of an individual from Culion Island. Unfortunately, *culionensis* was first published as a *nomen nudum* in Elera's "Catálogo Sistemático de toda la fauna de Filipinas conocida hasta el presente y á la vez el de la Colección Zoológica del Museo PP. Dominicos del Colegio-Universidad de Santo Tomás de Manila," a three-volume work published in 1895 by the Colegio de Santo Tomás containing an extensive synonymy, the native names, the distribution of a vast number of species, but no descriptions. After Elera's death his notes on Philippine mammals were collected and published by Fr. Florencio Llanos, director of the Museum of the Colegio of Santo Tomás. In this later work there is a detailed account of the external characters and of the habits of *culionensis* together with a picture, presumably of the type. Culion and the Calamianes are the only localities given for this species and *P. javanica* is mentioned as occurring on Palawan. Hollister (1912, p. 35) gives *javanica* for Palawan on the strength of the records of Casto de Elera and of Bourns and Worcester. Taylor (1934, p. 69) describes a pangolin in the possession of "Mr. Macasaet, Iwahig," Palawan, as having three rows of keeled scales on the tail and seven on the hind legs. In the absence of sufficient comparative material he calls it *javanica* and puts *culionensis* into the synonymy. If this individual actually did come from Palawan it appears likely that there are two species on this island, one with smooth and the other with keeled scales. The three individuals at hand are so distinct from a topotypical specimen of *javanica* as to make any confusion between the two impossible, all are very pale, a rather dirty yellowish white, with translucent scales that are extraordinarily thick, the heaviest ones resembling in texture a coarse, horny toenail. On the scales of the dorsal surface of the tail, the head and the limbs, a well-defined line separates the whiter basal part that is attached to the skin from a narrow, dark, free margin. A similar line on the scales of the back is more difficult to discern as the free portion of the scale is longer. The scales in *javanica* are thin with pronounced longitudinal striations on their outer surface and a smooth under surface; those of



*culionensis* are tremendously heavy with only a few striations visible at the extreme base of some of the scales, especially those of the lower back and the upper tail. On the under surface they all have a series of ridges running parallel with the distal line of attachment of the skin. The ridges seem to mark the growth of successive layers of horny substance; the free margin of the scale formed in this way is brittle, the layers breaking unevenly very much the way a fingernail breaks. Except for the folded scales on the outer margin of the tail, and, on the posterior side of each hind leg, one row of not more than four very slightly peaked scales, there is no trace at all of the ridging that is so prominent on the scales of the sides, the hind legs, and to a lesser degree the fore legs of typical *javanica*. The outline of the individual scales is also very different in the two species, in *culionensis* the distal edge of the scales of the anterior back is three sided, resembling half a hexagon; in *javanica* it is evenly rounded or else drawn down into a slight point. On the lower back in the latter the point becomes more pronounced, but in the former the scales of this region are so broken as to make it impossible to determine their exact shape although the tendency is away from the three-sided margin with marked angles to a more evenly curved, very broad scale. In *javanica* the keeled scales of the sides are long and pointed, in *culionensis* the distal edges of the flat scales on the sides are evenly rounded some of them actually semicircular. A similar difference obtains for the much smaller scales on the fore and hind limbs of both species. In *culionensis*, on the posterior half of the head, the scales are much smaller than those of the few rows anterior to the eyes, whereas in *javanica* there is a gradual increase in size from the scales at the end of the snout to those on the neck. Most striking is the difference in the two species in proportion of the three scales in the diagonal row immediately above the proximal folded scale on the lateral margin of the tail. In *culionensis* the middle one of these measures from one and one half to twice as long as the scale immediately overlying it, whereas in *javanica* it is only slightly longer than the ones overlying it. Behind the shoulder there is a similar but not so extreme difference in size between the two scales that form the diagonal continuation of the posterior rows on the fore limb and the scales overlying them. On the under surface of the tail in *culionensis* the central row of scales has been modified in a way which I have not observed in any other of the genera of pangolins: the central portion of the scale grows into an almost parallel-sided projection flat at the end, sometimes as long as 5 mm. with the result that the detached margin of the scale follows parallel to the line of attachment of the skin for one

third of the width of the scale on each side. The central third has the free edge of the scale sometimes as much as four times as wide as it is on the sides. *P. culionensis* may further be distinguished by its large, very stout claws. The fourth claw on the front foot is longer than the second whereas in *javanica* these two are almost equal in length. In dried specimens the tail, measured from the tip to the end of the row of folded scales, is almost as long as the head and body in *culionensis*, whereas in *javanica* it is from two thirds to three quarters as long. In the former, the extreme tip has the horny almost scale-like pad mentioned by Pocock as characteristic of *Paramanis*. The pinna of the ear is a thicker, more projecting fold in *culionensis* and is further characterized by a scale actually growing on the upper margin close to the point of attachment to the head.

Externally *culionensis* differs from the other described forms to such an extent as to make its generic classification very difficult. Pocock (1924) separates the pangolins into six genera on the basis of the shape of the sternum and various external characters. The specimens at hand are all females so it remains to be determined later whether or not males of this species have the "deep, probably glandular," depression behind the anus said by Pocock (1924, p. 723) to be typical of the subfamily *Maninac*; as we have no skeletons the same holds true for the shape of the xiphisternum. From an examination of dried skins, the pinna of the ear in the Palawan animal appears more highly developed than in typical *Paramanis* but not as much so as in typical *Manis*. The proportions of the claws and the membranous pad at the tip of the tail seem to ally this form most closely with *Paramanis*. In spite of the very different external appearance of the two species, the skulls of *culionensis* resemble those of *javanica* much more closely than they do those of any other genus of pangolin. In both, the skull is long with an incomplete zygomatic arch whose vestigial roots are widely separated, the zygomatic process of the maxillary is a particularly slender weakly developed bony projection, the inflation of the maxillary bones along the margin of the palate is much slighter than in *Phatages* and the ventral projection of the premaxillaries between the maxillaries is much longer than in *Manis*.

*Skull.* Cranially, *P. culionensis* may be distinguished from *javanica* by its remarkably slender skull. The rostrum particularly is elongated, the premaxillaries project well beyond the tip of the nasals and the lateral maxillo-premaxillary suture extends much farther posteriorly than the notch in the nasal bones. The nasals are long and slender and the greatest width, instead of being at the point where the nasals,

frontals and maxillaries join, is across the lateral projections of the nasals at the extreme tip of these bones. On the palate, posterior to the ventral projection of the premaxillaries, the maxillaries are further separated by a thin edge of the vomer varying from 9.1 to 11.0 mm. in length. The zygomatic process of the maxillary is a peg-like projection constricted at the base instead of being slender, flattened and triangular in outline when viewed from the side. The posterior margin of the palate is marked by two small, rounded knobs of bone in *culionensis*, there is no notch immediately back of them, and the lateral margins of the pterygoid fossae are on the same level as the palate instead of being markedly lower as is the case with *javanica*.

*Distribution.* From the evidence at hand *culionensis* appears to be a very divergent species of *Paramanis* occurring on Culion, Calamianes, and Palawan. Possibly there is another species of pangolin of the *javanica* type with keeled scales on some of these islands; however, it seems more likely that all of the records of *javanica* from the Philippines should be attributed to *culionensis*.

## FAMILY TRAGULIDAE. MOUSE-DEER

### TRAGULUS NIGRICANS Thomas

*Tragulus nigricans* Thomas, Ann. Mag. Nat. Hist., (9), 6, March 1892, p. 250  
(Balabac Island, P. I.).

The collection contains four topotypical specimens of this species.

## BIRDS

BY JAMES L. PETERS

Miss Lawrence herself collected birds during her stay on Luzon, Mindanao and Basilan at the localities mentioned in the Introduction, but for her visit to Mindoro she was very fortunate in securing temporarily the services of Mr. Francisco Rivera of the Philippine Bureau of Science. Mr. Rivera collected birds only, and was employed off and on from early in March until near the middle of May, in that period securing an even 500 birds from the following localities on Mindoro:

Naujan: Lake Naujan, Ariaod, Merit, Bayog, Salibagon

Calapan: Calawang, Paltabaan, Carayrayan, Anuling, Binugsucan, Alsanagon

Pola: Subaan, Pasi, Antipolo

Baco: Casungo

and at Bignay on the slopes of Mt. Halcon.

## ANHINGIDAE

*ANHINGA RUFA MELANOGASTER* Pennant

Mindoro: Lake Naujan, 1 ♀, 7 March, 1937.

## ARDEIDAE

*ARDEA PURPUREA MANILENSIS* Meyen

Mindoro: Calawang, 1 ad. ♂, 1 imm. ♀, 10 May, 1937.

The adult is in somewhat worn nuptial plumage.

*BUTORIDES STRIATUS JAVANICUS* (Horsfield)

Mindoro: Ariaod, 1 ♀, 16 April, 1937.

*BUBULCUS IBIS COROMANDUS* (Boddaert)

Mindoro: Paltabaan, 1 ♀, 15 April, 1937.

Salomonsen (1929, pp. 347-357), following the lead set by the editors of the Practical Handbook of British Birds, 2, 1921, p. 208, unites the genera *Ardeola* and *Bubulcus*. While genera are in part a matter of convenience and of opinion, it seems to me that the various species of

Ardeola make up a natural group, the homogeneity of which is broken by the inclusion of *Bubulcus ibis*. Heron genera are difficult to define, since there is a great similarity in the external characters of all of them, and if some emphasis is not laid on the character of the nuptial plumes, there is little left on which to base a convenient generic arrangement.

#### EGRETta GARZETTA GARZETTA (Linné)

Mindoro: Merit, 1 ♂, 6 March, 1937.

In the first volume (1931, p. 111) of my Check List I included the Philippines as well as the Sunda Islands in the range of *E. g. nigripes*. As a matter of fact the latter form probably does not have a very extensive range; certainly Miss Lawrence's bird is much more like specimens of *garzetta* from China than like *nigripes* from Java. Chasen (1935, p. 56) includes Sumatra and Borneo in the range of *garzetta*, attributing *nigripes* only to Java with certainty.

#### NYCTICORAX CALEDONICUS MANILLENSIS Vigors

Mindoro: Carayrayan, 1 imm. ♀, 12 April, 1937.

The wing of this specimen measures 307, culmen from frontal feathering, 70.5 mm.

### ACCIPITRIDAE

#### ELANUS CAERULEUS HYPOLEUCUS Gould

Mindoro: Calawang, 1 ♀, 6 April, 1937.

This race differs chiefly from *E. c. vociferus* of southeastern Asia in having only the terminal half, or less, of the primaries black; the basal portion is white, shading into the black tip through a freckled area; in *vociferus* the entire exposed under surface of the primaries is black. *E. c. hypoleucus* is also more purely white below, lacking the pale grayish wash on the sides of the breast so evident in *vociferus*.

#### HALIASTUR INDUS INTERMEDIUS Blyth

Mindoro: Casungo, 1 ♀, 1 May; Ariaod, 1 ♀, 7 May, 1937.

Both perfectly typical examples of this wide ranging form; the bird shot at Casungo has the whole head and breast lined with narrow dusky shaft stripes, while in the Ariaod specimen these stripes are missing, their place being taken by faint rusty frecklings, most noticeable toward the base of the feathers.

## ACCIPITER VIRGATUS CONFUSUS Hartert

Luzon: near Bangued, 1 ♀, 31 January, 1937.

This specimen is obviously a bird hatched the previous summer, and the fact that the closely related *A. gularis* occurs in the Philippines during the winter months, makes it necessary to exercise more than usual care in making the identification. The wing measures 171.5 mm. as against 181.5–194 for *gularis*; middle toe (without claw) 33 as against 29.7–32.9; tarsus longer, 54 for *confusus*, 49–53 for *gularis*. These proportional differences, *i.e.*, shorter wing and longer tarsi and toes, coupled with some feathers on sides of breast which are deeper and more extensively reddish brown, would seem to preclude the possibility of confusing the specimen with *gularis*.

*A. v. confusus* is evidently the endemic form of *A. virgatus* in the Philippines; the possibility of the occurrence of *A. v. affinis* Hodgson, which occurs in winter on the opposite mainland and the islands of Formosa and Hainan must also be considered.

## BUTASTUR INDICUS (Gmelin)

Luzon: near Bangued, 1 ♀, 29 January.

Mindoro: Merit, 2 ♀, 6 March, 1937.

## SPIZAËTUS CIRRIATUS LIMNAEETUS (Horsfield)

Mindoro: Ariaod, 1 ♂, 8 May, 1937.

## ICTHYOPHAGA ICTHYAETUS ICTHYAETUS (Horsfield)

Mindoro: Carayrayan, 1 ♂, 12 April, 1937.

## SPILORNIS HOLOSPILUS (Vigors)

Mindoro: Calawang, 1 ♂, 30 April; Casungo, 1 ♂, 1 May; Ariaod, 1 ♂, 7 May; Subaan, 1 ♂, 14 March.

Basilan: 15 km. northeast of Maluso, 1 ♂, 25 April; near Isabela, 1 ♀, 12 May, 1937.

McGregor (1909, pp. 228–230) recognized two “species” of *Spilornis* (exclusive of the Palawan group) from the Philippines; *holospilus* (type locality, Luzon) inhabiting Basilan, Bongao, Catanduanes, Cebu, Leyte, Luzon, Marinduque, Mindanao, Mindoro, Samar, Sulu and Tawi Tawi, and *panayensis* found on Bohol, Guimaras, Masbate, Negros, Romblon, Sibuyan, and Tablas.



The distinguishing characters given for *panayensis* as opposed to *holospilus* were breast and abdomen lighter; chin and throat light gray (instead of blue-gray); size smaller. Even so McGregor regarded the validity of *panayensis* as "somewhat doubtful."

Hachisuka (1934, pp. 22-23) disposed of *panayensis* as a synonym of *holospilus* as "a pale individual variety" since both occurred at Davao, Mindanao.

As a matter of fact the lumping of all the Philippine Serpent Eagles under a single name is an easy way of avoiding a complicated situation. Miss Lawrence's series reenforced by two other specimens from Mindanao indeed show the hopelessness of trying to subdivide on color characters; there is a tremendous range of individual variation, but if the sexing is to be relied on at all, it will be seen from the attached table that the Mindoro birds run much larger than specimens from either Mindanao or Basilan, although all these three islands lie within the range of *holospilus* as defined by McGregor. Lacking topotypical material of either race and no representation from any other islands except those listed, it is not possible to draw any final conclusions.

Basilan	♂	wing 332	tail 240	tarsus 77
	♀	335	235	78
Mindoro	♂	368	255	87.5
	♂	370	245	84
	♂	372	241	90
	♂	380	263	94
Mindanao	♂	338	235	78
	♀	338	230	81

McGregor gives for *holospilus* wing 368; tail, 254; tarsus, 90; and for *panayensis* wing, 317; tail, 229; tarsus, 71.

Whether these measurements represent an average for a series, or are those of a single specimen of each is not stated. Hachisuka copies McGregor's figures without adding any of his own. Swann gives for *holospilus* ♂ wing 341, ♀ wing 367.

## FALCONIDAE

### MICROHIERAX ERYTHROGENYS (Vigors)

Mindoro: 1 ♀, Pasi, 5 March, 1937.

Ogilvie-Grant (1897, p. 220) described *M. e. meridionalis* (Samar, Cebu and Mindanao) as considerably larger than *erythrogenys*, the under wing coverts and inner webs of the primaries uniform black in

the ♂ (instead of being barred with white as in ♂ of *erythrogeus*); and belly, vent and undertail coverts washed with pale fulvous. McGregor (1909, pp. 238-239) commented that *meridionalis* was of doubtful validity but that the name might be retained until more specimens had been examined. He also pointed out that the white bars on the inner webs of the primaries were an age characteristic due to immaturity and that adult males did not possess them. Hachisuka (1934, pp. 36-37) repeated what McGregor had published about the two forms, but omitted McGregor's statement about the doubt attached to the distinctness of *meridionalis* and the remark about barred primaries.

While the material available to me is very inadequate, consisting only of a ♂ and two ♀ from Mindanao (*meridionalis*) and the Rivera specimen from Mindoro (*erythrogeus*, but not topotypical), it seems as though Grant's distinctions broke down at once. The Mindanao ♂ has a few white spots on the inner primaries and the belly, vent and undertail coverts are white, not "washed with pale fulvous"; one of the ♀, worn and molting, has the primaries spotted on the inner web with white and moreover a new inner primary just growing in has white spots; there is a faint "pale fulvous" wash on the belly; the other ♀ has the under surface of the primaries entirely black, but belly, etc. are pure white. The Mindoro bird is like the second Mindanao bird but belly, etc. with "pale fulvous" wash. Thus it will be seen that the color characters break down completely. The following table of measurements is based on the four specimens already discussed, plus the measurements published by McGregor

		wing	tail	culmen	tarsus
♂	Bohol (McGregor)	110	63	13	
♂	Mindoro (McGregor)	110	68	11	20
♂	Mindanao (MCZ)	118	62.5	12	21
♂	Mindanao (McGregor)	113	66	13	22
♀	Luzon (McGregor)	110	66	12	
♀	Mindoro (MCZ)	116.5	69	11.2	20.2
♀	Mindanao (MCZ)	102 (worn)	63	12.3	21.5
♀	Mindanao (MCZ)	114.5	69	13.7	23
♀	Samar (McGregor)	117	70	13	22

Grant's wing measurements (converted from inches and hundredths) are for ♂ Luzon: 103, 102, 103; Samar: 109; Mindanao: 110.5, 115.6. For ♀ Luzon: 108, 108, 108, 110.5, 115.6; Cebu: 122; Samar: 117, 117; Mindanao: 117.

In my opinion the measurements are too variable to constitute a recognizable form based on size, and I therefore prefer to synonymize *meridionalis* with *erythrogyas*.

## PHASIANIDAE

### GALLUS GALLUS GALLUS Linné

Mindoro: Pasi, 1 ♀, 14 March; Bayog, 1 ♂, 1 ♀, 10 April and 3 May, 1937.

## TURNICIDAE

### TURNIX SUSCITATOR FASCIATA (Temminck)

Mindoro: Subaan, 1 ♂, 2 ♀, 14 March, 1937.

## RALLIDAE

### RALLUS PHILIPPENSIS PHILIPPENSIS Linné

Luzon: Lagangilang, near Bangued, 1 ♂ ?, 12 January, 1937.

This specimen is molting from immature to adult plumage and has acquired but faint traces of the chestnut nape, and only a few of the conspicuously black and white barred feathers on the underparts; the feathers of the hind neck and upper back are dusky with wide olivaceous edges and a few have small white spots on both webs. In the adult the corresponding plumage is black (or nearly so) with two to three white spots on the outer part of each web.

### RALLUS TORQUATUS TORQUATUS Linné

Mindoro: Palatabaan, 1 ♂, 15 April, 1937.

### AMAUORNIS OLIVACEA OLIVACEA (Meyen)

Mindoro: Calawang, 1 ♂, 30 April, 1937.

Though recorded by McGregor on the authority of Bourns and Worcester as "a common bird snared in abundance by the natives," this species has not been taken previously by any one collecting in the Philippines for this museum.

### AMAUORNIS PHOENICURUS JAVANICA (Horsfield)

Mindoro: Pola, 1 ♀, 14 March; Casungo, 1 ♂, 1 May; Bayog, 1 ♀, 3 May;

Anuling, 3 ♂, 6 May, 1937 (+ 1 no sex or locality, 9 March)

Basilan: 1 ♂, 15 km. northeast of Maluso.

Size variation in relation to geography in *Amaurornis phoenicurus* is such that the recognition of subspecies on this basis is largely a matter of preference. Stresemann (1913, pp. 303-305) assigns to *javanica* a range that includes Sumatra and adjacent small islands, Java, Bali, Kangean, Banka, Borneo, Natuna Islands, the Philippines, Sangir and Talaut Islands. He does not list the measurements of the birds by islands nor does he differentiate between the sexes, but the wing measurements of a large series examined by him range from 136-163 mm. with an average of 149.5. Birds from the greater part of southeastern Asia are referred to *chinensis*; Stresemann's wing measurement for a very large series from this area run between 144-187, average 163.1.

I have made wing measurements of small representative series with the following results:

Eastern China,	5 ♂, 164-174 [170];	5 ♀, 155-167 [159]
Philippines	6 ♂, 138-158 [148];	3 ♀, 142-152 [146.3]
Borneo		1 ♀, 128
Sumatra		1 ♀, 137
Nias	1 ♂, 143	
Java	4 ♂, 123-143 [134];	2 ♀, 129-134 [131.5].

Thus it is apparent that the Philippine birds occupy an intermediate position between the continental bird on the one hand and the bird of the Sunda Islands on the other, but near the smaller race. The difference at best is only average and certainly not worth naming.

#### GALLICREX CINEREA (Gmelin)

Mindoro: Calawang, 1 ♂, 4 May, 1937.

#### GALLINULA CHLOROPUS INDICA Blyth

Mindoro: Lake Naujan, 2 ♂, 1 ♀, 7 March, 1937.

These three specimens beyond a doubt represent the form of eastern Asia, some individuals of which may winter in the Philippines though no hint of any migratory movement in the Islands is given by McGregor or Hachisuka. La Touche (1932, pp. 284-285), however, tells us that this form is migratory in northern China. The three skins are in fresh unworn plumage with shrunken frontal shields; the back and wing coverts are strongly olive brown, just like the mainland form; the wings of both males measure 167 mm., that of the female 161. Ten birds from eastern China, five of either sex, especially measured at the

same time give for males 160, 163, 163, 169, 170; females 149, 152, 153, 156, 159.

The identity of the resident race of *G. chloropus* in the Philippines is as uncertain as when Hartert (1921, pp. 1840-1844) reviewed the species. At that time he showed that the characters on which Lletget relied for the separation of *loanoi* are found in other races or dependent on season or age. I am unable to distinguish resident gallinules from Mindanao and Mindoro from Javan (topotypical) examples of *orientalis*; in the latter race the olive brown area is confined to the back, the wing coverts being slaty like the rest of the body plumage. My series of Javan birds affords the following wing measurements, males 143, 150, 151; females 141, 145, 149, 150. Two males from Mindoro give 157, 157, Mindanao male 152, female 151. Not sexed 148, 150. Two males and a female from Luzon (topotypical *loanoi*) have an olive wash on the wing coverts, thus appearing intermediate between *orientalis* and *indicus*; their size also is intermediate, males 143, 155; female 153.

Naturally small series cannot be expected to give satisfactory results, so my conclusions, which can be regarded as only tentative, are as follows: that the resident birds of Mindoro and Mindanao should be called *G. ch. orientalis* Horsfield while breeding birds from Luzon may be called *G. ch. loanoi* Lletget. I cannot help feeling that adequate series would show the resident bird of the entire Philippine Archipelago to prove inseparable from *orientalis*.

#### PORPHYRIO PULVERULENTUS Temminck

Mindoro: Pasi, 1 ♂, 15 March, 1937.

### JACANIDAE

#### HYDROPHASIANUS CHIRURGUS (Scopoli)

Mindoro: 1 ♂, 15 March, 1937.

### CHARADRIIDAE

#### CHARADRIUS DUBIUS DUBIUS (Scopoli)

Luzon: near Bangued, 1 ♀, 25 January, 1937.

This bird has wing of 107.3 and culmen of 14 mm.

## SCOLOPACIDAE

## ACTITIS HYPOLEUCOS (Linné)

Mindoro: Casungo, 1 ♀, 1 May, 1937.

## CAPELLA MEGALA (Swinhoe)

Mindoro: Pasi, 1 ♀, 13 March, 1937.

## COLUMBIDAE

## TRERON CURVIROSTRA ERIMACRA Oberholser

Mindoro: Ariaod, 1 ♂, 17 May, 1937.

The Philippine race of this fruit pigeon is very distinct, being readily distinguishable from its geographically nearest relative, *T. c. nasica* Schlegel of Borneo. Compared with two males from Borneo whose wings measure 125 and 126 mm., this Mindoro bird has a wing of 136, and in addition to its larger size the underparts are a much brighter yellowish green. From *T. c. nipalensis* (Hodgson) it differs chiefly in having the back and scapulars a much deeper maroon shade. *T. c. curvirostra* (Gmelin) of the Malay Peninsula and Sumatra and *T. c. nasica* are very close; in fact I am unable to discover any constant characters by which the two can be distinguished. Perhaps in larger series than are available to me some differences may be apparent, so Schlegel's name for the Bornean bird may be allowed to stand.<sup>1</sup>

In view of the rather wide distribution of *Treron curvirostra* it is difficult to explain the limited distribution of *erimacra* in the Philippines where it is known only from Palawan, Balabac and Mindoro.

## TRERON POMPADORA AXILLARIS (Bonaparte)

Mindoro: Merit, 1 ♂, 6 March; Pasi, 2 ♂, 2 ♀, 5-11 March; Subaan, 1 ♂, 12 March; Anuling, 1 ♀, 7 April; Carayrayan, 1 ♀, 13 April, 1937.  
Basilan: 15 km. northeast of Maluso, 1 ♂, 19 April, 1937.

The Basilan specimen agrees with the series from Mindoro and shows no approach to the more yellow *everetti* of the Sulu Archipelago.

<sup>1</sup> Chasen (1935, p. 12) synonymizes *nasica* with *curvirostra*.



## TRERON VERNANS VERNANS (Linné)

Mindanao: Zamboanga, 1 ♂, 31 March, 1937.

There can be no doubt that *T. v. nesophasma* (Oberholser) from Mindanao is indistinguishable from *T. v. vernans*. Manuel (June 1936, p. 162) examined 24 ♂ and 15 ♀ from Bantayan, Basilan, Bohol, Bongao, Jintotolo, Luzon, Mindoro, Negros, Palawan, Siasi and Siquijor and could detect no differences between the birds from these various islands. His measurements (not differentiated as to sex or island) range, wing 145–154 (148.6); tail 92–104 (97.3); culmen 15–17 (15.9). Rivera's bird measures, wing 147.6; tail 100.5; culmen 16.4. It will be seen that the measurements of topotypical "*nesophasma*" are very close to the average of those of *T. v. vernans* from the rest of the Archipelago. The color characters claimed for *nesophasma* are paler throughout and green of upper parts averaging more grayish. These differences are not apparent when comparing the Mindanao bird with a series of 5 ♂ from Palawan.

## PHAPITERON LEUCOTIS LEUCOTIS (Temminck)

Mindoro: Mt. Halcon, 3 ♂, 1 ♀, 25–27 April; Subaan, 1 ♂, 12 March; Pasi, 1 ♂, 2 ♀, 4–10 March; Merit, 1 ♂, 1 ♀, 6 March; Bayog, 1 ♂, 10 April; Ariaod, 2 ♂, 1 ♀, 8 and 16 April; Anuling, 2 ♂, 2 ♀, 7 April; Calawang, 1 ♂, 6 April; Carayrayan, 1 ♂, 13 April; Paltabaan, 1 ♂, 1 ♀, 15 April, 1937.

This fine series shows the range of individual variation in this pigeon very well, since all the skins are in fine feather and the purple, green, blue and coppery iridescence show to excellent advantage. According to Manuel (Feb. 1936, pp. 291–292) Hachisuka's type of *mindorensis* is a particularly highly colored individual with more purplish iridescence on the back, tail and wing coverts.

## PHAPITRERON LEUCOTIS BREVIROSTRIS (Tweeddale)

Mindanao: near Zamboanga, 1 –, 2 April, 1937.

## PHAPITRERON LEUCOTIS OCCIPITALIS (Salvadori)

Basilan: 15 km. northeast of Maluso, 2 ♂, 1 ♀, 19 and 21 April, 1937.

This form is easily distinguished from *brevirostris* of Mindanao by more extensive as well as more intense lilaceous iridescence on the nape and occiput, and the deeper brown throat.

## PHAPITRERON AMETHYSTINA BRUNNEICEPS (Bourns and Worcester)

Basilan: 15 km. northeast of Maluso, 1 ♂, 1 ♀, 22 and 29 April, 1937.

These are topotypical examples of this race which is confined to Basilan. Lack of comparative material prevents a discussion of any of the seven or more races into which this pigeon is now subdivided.

## LEUCOTRERON OCCIPITALIS OCCIPITALIS (G. R. Gray)

Mindoro: Pasi, 1 ♀, 5 March; Mt. Halcon, 1 ♂, 21 April, 1937.

Manuel (March, 1936, p. 331) believes that the bird originally described from Butuan, Mindanao from a young ♀ by Tweeddale and named *incognita*, is the same as the bird later described by Hachisuka from Mt. Apo, Mindanao, and that neither is distinct from the birds inhabiting Luzon, Mindoro, Negros, Cebu, Leyte, Samar and Basilan. Manuel's Mindanao material was from three lowland towns on this island—Agusan, Surigao and Davao and consisted of eight skins. These he was unable to separate from specimens from other islands in the Archipelago. While admitting the superiority of Manuel's material, I have available for comparison four topotypes of *brevipes*, and these differ from two Mindoro specimens in having deeper colored orange (Sienna) patches on the breast, smaller and darker red abdominal patch which is more widely bordered with green on the sides, and the posterior underparts more green, less gray; the tarsus is also shorter.

Under the circumstances I feel that it is best to recognize a highland race of this fruit pigeon from Mindanao under the name of *Leucotreron occipitalis brevipes* Hachisuka.

Measurements.

Mindoro	♂	wing 161	tarsus 27.7
	♀	150	28.8
Mindanao (Mt. Apo)	♂	148	26.6
	♂	152	25.8
	♂	151	26.6

## LEUCOTRERON LECLANCHERI LECLANCHERI

Mindoro: near Calapan, 1 ♀, 15 March; Mt. Halcon, 1 ♀, 25 April, 1937.

There appear to be three recognizable races of this fruit pigeon whose names, characters and ranges are as follows:

*L. l. longialis* Manuel,—similar to the typical form but with longer wings and tail, males, wing, 160, 161; tail, 119, 121. Females, wing, 164; tail, 118. Batanes and Babuyanes groups of islands north of Luzon.

*L. l. leclancheri* (Bonaparte),—smaller than *longialis*, green of plumage not as deep as in *gironieri*; 2 males, Calagua Island, wing, 142, 150; tail, 106, 117; 2 females, Mindoro, wing, 143, 148; tail, 106, 105 (Manuel's measurements (Feb. 1936, p. 307), 14 specimens from Luzon, wing, 138–156; tail, 100–110). Philippines generally except the Batanes and Babuyanes Islands and islands of the Palawan group.

*L. l. gironieri* Verreaux and Des Murs, of about the same size as *l. leclancheri*, but top of head of male more grayish and sharply contrasted with the color of the back, green of body plumage deeper. Islands of Palawan, Busuanga and Culion. *L. l. palawana* Hachisuka is an absolute synonym.

#### DUCULA AENEA CHALYBURA (Bonaparte)

Mindoro: Pasi, 3 ♂, 1 ♀, 5 March; Anuling, 1 ♂, 7 April; Bayog, 2 ♂, 2 ♀, 10 April; Mt. Halcon, 2 ♂, 1 ♀, 22–25 April; Ariaod, 3 ♂, 2 ♀, 8 April, 14–20 May, 1937.

A fine series of beautifully prepared clean skins which reflects credit on the skill of Mr. Francisco Rivera. These birds are not distinguishable from specimens from Luzon and Calagua. *D. ae. palawanensis* is much bluer above, but occasionally an odd skin of *chalybura* is almost as blue; such a bird was taken on Calagua Island 26 June, 1921 by Governor General Forbes and it must have been a bird of this style that induced Hachisuka to record both *palawanensis* and *chalybura* from Mindoro. All of Miss Lawrence's specimens, however, are quite typical of the latter race.

I have not seen birds from islands in the Babuyan group; these have been separated by Hachisuka on the basis of larger size, nor from Mindanao, whence Manuel has recently separated *D. ae. glaucocauda*.

#### DUCULA CAROLA CAROLA (Bonaparte)

Mindoro: Mt. Halcon, 1 ♀, 29 April, 1937.

#### COLUMBA VITENSIS GRISEOGULARIS (Walden and Layard)

Mindoro: Mt. Halcon, 1 ♂, 24 April, 1937.

*MACROPYGIA PHASIANELLA TENUIROSTRIS* Bonaparte

Luzon: near Bangued, 3 ♂, 1 ♀, 22 January.

Mindoro: Anuling, 1 ♂, 7 April; Carayrayan, 2 ♂, 2 ♀, 12 April; Paltabaan, 2 ♂, 1 ♀, 15 April; Ariaod, 3 ♂, 16 April, 15 and 16 May; Bayog, 1 ♂, 1 ♀, 2 May; Alsanagon, 2 ♂, 11 May.

Basilan: 15 km. northeast of Maluso, 2 ♂, 1 ♀, 19-22 April, 1937.

*STREPTOPELIA BITORQUATA DUSUMIERI* (Temminck)

Luzon: near Bangued, 1 ♀, 16 January.

Mindoro: Anuling, 1 ♂, 11 April; Carayrayan, 1 ♂, 12 April; Calawang, 1 ♂, 30 April; Ariaod, 1 ♂, 17 May, 1937.

*GEOPELIA STRIATA STRIATA* (Linné)

Luzon: near Bangued, 2 ♀, 13 and 14 January, 1937.

Philippine specimens of the Striated Ground-dove are quite indistinguishable from topotypical Javan examples both in color and in size. Five skins from Java have wing measurements between 92 and 99.5 mm.; six Philippine birds 93-98.5. The distribution of this species in the Philippines is peculiar, being found in only a few of the northern islands, particularly Luzon, absent from the Palawan group and from the rest of the Archipelago south of Mindoro. The assumption is that the bird reached the Philippines from the continent in comparatively recent time.

*CHALCOPHAPS INDICA INDICA* (Linné)

Luzon: near Bangued, 3 ♂, 15-27 January.

Mindoro: Calawang, 2 ♂, 1 ♀, 14-30 April; Ariaod, 1 ♂, 15 May.

Basilan: 15 km. northeast of Maluso, 3 ♀, 20-25 April, 1937.

I have compared our Philippine material with specimens from the Riu Kiu Islands,<sup>1</sup> Borneo, Sumatra, Java and Siam and cannot discover any geographic variation within this range. Available material from the mainland is very meagre, but what I have seen does not lead me to believe that it is possible to distinguish between the continental birds and the ones inhabiting the large islands to the southeastward. There

<sup>1</sup> Hachisuka has recently named (Bull. Brit. Orn. Cl., 59, 1939, p. 45) the Emerald Dove of the Riu Kiu Islands, calling it *C. l. yamashinai*, comparing it only with specimens from Formosa. The sole character given for distinguishing *yamashinai* is a wash of bluish slate over the vinaceous of the hind neck and upper back. This character, which is found only in the males, is a variable one in extent and amount. I have not examined Formosan examples, but note that the wash of bluish slate referred to is present in most examples examined by me from India, Siam, Indochina, Sumatra, Java, Borneo, the Philippines and the Riu Kiu Islands.

are several currently recognized races occupying relatively small islands on the periphery of the range of *C. indica*; *robinsoni* of Ceylon seems to me to be rather doubtful, as does *sangirensis* confined to Great Sangi Island; *maxima* of the Andamans and *minima* of the islands in Geelvink Bay are average size splits, neither very striking. Of course *chrysochlora* and *sandwichensis* are easily recognizable forms.

#### GALLICOLUMBA PLATENAE (Salvadori)

Mindoro: Bayog, 1 ♂, 2 May, 1937.

From the taxonomic standpoint it is rather difficult to decide just how the Philippine bleeding heart pigeons should be treated; there cannot be the slightest doubt that the birds are all representative forms, and their common ancestry is apparent in the red or orange spot of modified feathers in the center of the breast of each form, but the many differences in color and markings are a drawback to the use of trinomials.

### PSITTACIDAE

#### KAKATOE HAEMATUROPYGIA (Müller)

Mindoro: Bayog, 1 ♀, 3 May; Calawang, 1 ♂, 14 May, 1937.

Hachisuka named the Polillo race *megregori* on the basis of larger size; he had but the type, a ♂, which had a wing of 225 and culmen of 29. His average measurements for birds from Bohol, Luzon and Mindanao (number not stated and sexes not differentiated) wing 213, culmen 27. The Polillo race requires confirmation based on adequate series, especially since an occasional large individual may occur in a given population.

Measurements of the series available to me follow:

Balabac	♀	wing 211	culmen 25
	♂	" 219	" 26.7
Mindoro	♂	" 213	" 24.1
	♀	" 219	" 25.4
	♀	" 206	" 24.5
Gigante Island (near Panay)	♀	" 210	" 25.1
Negros	♂	" 215	" 24.5
Palawan	♂	" 227	" 28.1
	—	" 210	" 25.2

## PRIONITURUS DISCURUS DISCURUS (Vieillot)

Mindanao: 50 km. northeast of Zamboanga, 1 ♀, 4 April, 1937.

## PRIONITURUS DISCURUS MINDORENSIS Steere

Mindoro: Pasi, 4 ♂, 2 ♀, 4-10 March; Calawang, 1 ♂, 5 ♀, 6 April; Anuling, 1 ♂, 1 ♀, 7 April; Bayog, 1 ♂, 1 ♀, 10 April, 2 May; Ariaod, 1 ♀, 16 May; Paltabaan, 1 ♂, 15 April, 1937.

## TANYGNATHUS LUCIONENSIS LUCIONENSIS (Linné)

Mindoro: Calawang, 2 ♂, 6 and 9 April; Carayrayan, 1 ♂, 13 April; Ariaod, 2 ♂, 6 April and 9 May, 1937.

Three of the Mindoro birds are fully adult with well developed black shoulder patches and black centres to the median coverts, as well as blue crown and blue spots on the scapulars; the other two Mindoro birds are in immature plumage in which the black on the wings is absent and the blue confined chiefly to the lower back. The Basilan specimen is in a plumage midway between immature and adult. There is a good deal of size variation in birds from the same place and this, taken with the rather complex plumage changes makes the study of geographic variation in this species rather unsatisfactory unless very large series are available. Hachisuka has named three races, *paraguenuus* from Palawan; *koikei* from Mindanao and *moro* from Jolo.

Wing measurements of the birds available to me are as follows: Mindoro, 6 ♂, 177, 182, 188, 192, 193, 197; Negros, 1 ♀, 177; Basilan, 2 ♂, 182, 185, 1 ♀, 178.

In the absence of topotypical Luzon material I have considered Mindoro birds as representing the typical form, since no one has ever endeavored to separate them; Negros and Basilan birds agree with them. It is surprising to find the Basilan bird the same as that found on Mindoro when the Mindanao bird is apparently different. *T. l. koikei* was described as smaller than the typical form with the upper parts much darker. The single Mindanao bird available is a rather poorly prepared immature bird without indication of sex, so the color characters cannot be confirmed, but the wing of 165 mm. is the same as that given for the type of *koikei*; the race therefore may be maintained. Two immature males from Jolo show the paler green originally given as the distinguishing character by Hachisuka for his *T. l. moro*. This race too may be maintained.

*T. l. paraguenuus* was named on the basis of smaller size when com-



pared with the typical form, but I doubt if the race can stand. An adult and an immature ♂ before me measure 182 and 177 respectively, and thus fall within the lower brackets of measurements of true *lucionensis*.

#### LORICULUS PHILIPPENSIS PHILIPPENSIS (P. L. S. Müller)

Luzon: near Bangued, 1 ♂, 14 January, 1 ♀, 29 January, 1937.

The ♂ is a cage bird.

#### LORICULUS PHILIPPENSIS MINDORENSIS Steere

Mindoro: Pola, 1 ♂, 2 March; Subaan, 1 ♂, 12 March; Calawang, 5 ♂, 2 ♀, 5-9 April; Bayog, 1 ♀, 10 April; Salibagon, 2 ♂, 17 April; Mt. Halcon, 4 ♂, 2 ♀, 19-25 April; Calagan, 1 ♂, 1 ♀, 6 May; Ariaod, 4 ♂, 7-9 May, 1937.

A fine series of this very distinct race which is confined to Mindoro.

### CUCULIDAE

#### SURNICULUS LUGUBRIS VELUTINUS (Sharpe)

Mindoro: Mt. Halcon, 1 ♂, 20 April, 1937.

An extremely large specimen with wing of 130 and tail of 121 mm.

#### CUCULUS FUGAX PECTORALIS (Cabanis and Heine)

*Hiracococcyx pectoralis* Cabanis and Heine, Mus. Hein., Th. 4, 1862, Heft 1, p. 27 (Philippines).

Mindoro: Carayayan, 1 adult ♀, 12 April, 1937.

When first identifying this specimen I availed myself of Stresemann's (1930, p. 306) brief review of *C. fugax* and found to my astonishment that the bird did not agree with the diagnosis of any of the three races with which he dealt. I then remembered vaguely that Dr. Mayr had told me he planned to name a new resident race of *C. fugax* from the Philippines and hence I wrote him for further details. He replied to the effect that *Hiracococcyx pectoralis* of Cabanis and Heine was available for this bird, and has since published (1938, p. 20-26) a fresh revision of the races of *Cuculus fugax* in which the characters of the Philippine bird are clearly pointed out.

The bird taken by Mr. Rivera appears to be fully adult; it measures, wing, 172, tail, 159, bill, 19.5, wing-tip, 44.

## CUCULUS OPTATUS OPTATUS Gould

Mindoro: Anuling, 1 ♂, 7 April, 1937.

This specimen, with all the primaries in the right wing missing, is almost certainly referable to the typical form of this species that breeds in Siberia, northern China and the Japanese islands. McGregor (1909, p. 372) recorded this species from Mindanao and Palawan under the name of *Cuculus saturatus* Hodgson. His wing measurements of 188 mm. induced Hachisuka to refer the identification to *C. o. kelungensis* Swinhoe, a race not recognized in 1909 but now known to be the smaller southern form breeding in southeastern China and on Formosa. It appears, however, that McGregor's records were based on specimens collected by Platen, and the description of the bird was quoted, McGregor apparently having no specimens at hand; consequently Hachisuka's supposition that *kelungensis* is the race of *C. optatus* occurring in the Philippines is unwarranted. Males of *C. o. optatus* that I have measured from the Altai, Kentei Mountains, northern China and Japan have wing lengths from 184 to 206 mm.; the corresponding sex of *kelungensis* from Formosa and Fokien varies between 180-182. The Mindoro specimen has a wing of 194.5 and is therefore referable to the larger northern form which of course is only a winter visitor to the Philippines.

## CACOMANTIS VARIOLOSUS EVERETTI Hartert

Basilan: near Isabela, 1 not sexed, 11 May, 1937.

One of the surprises of Miss Lawrence's collection is a fine adult of this race. It agrees with Hartert's description in having the entire under surface chestnut to the base of the lower mandible. Hitherto *everetti* was known only from Tawi Tawi and Jolo. Hachisuka considers *merulinus* and *variolosus* to be conspecific, but the occurrence of forms of both on Basilan upsets his conclusions and shows that Hartert was correct (as he usually was) when he regarded *merulinus* and *variolosus* as specifically distinct. *C. v. everetti* is a larger bird than *C. m. merulinus*; the Basilan specimen has a wing of 113.5 mm. and tail of 132.7.

## CACOMANTIS MERULINUS MERULINUS (Scopoli)

Basilan: 15 km. northeast of Maluso, 1 adult ♂, 1 sub-adult ♀, 2 imm. ♀, 22-29 April, 1937.

These specimens have the following measurements:

	wing	tail
♂	100	105.5
♀	102.2	108.7
♀	99.3	103
♀	99.8	102.7

CHALCITES XANTHORHYNCHUS AMETHYSTINUS (Vigors)

Basilan: near Isabela, 1 ♂, 9 May, 1937.

This specimen is in fine fresh plumage. Compared with a ♂ of the typical form from Cachar, the rare Philippine bird is smaller with a wing of 93.5 mm. (against 101.8) and the gloss much deeper with a strong bluish tinge, less purely violaceous.

EUDYNAMYS SCOLOPACEA MINDANENSIS (Linné)

Mindoro: Subaan, 1 ♂, 12 March; Calawang, 1 ♀, 6 April; Paltabaan, 1 ♂, 15 April; Mt. Halcon, 2 ♂, 18 and 23 April, 1937.

Hachisuka has named the koel from Mindoro *E. s. onikakko*; the male of this proposed form is described as having the entire plumage glossy blue-black, but so do the males of the other races of *E. scolopacea*! The female is described as differing from *mindorensis* in having very little rufous tinge, the throat and breast being practically black and white. The Mindoro female before me is strongly rufescent. Hachisuka's proposed race appears to be based on variable characters and its recognition is not justified.

CENTROPUS STEEREI Bourns and Worcester

Mindoro: Pasi, 1 ♀, 10 March; Mt. Halcon, 1 ♂, 1 ♀, 22 April, 1937.

Very little idea of the distinctness of this species from *mindorensis*, with which it occurs, can be gained from reading McGregor's description in the Manual of Philippine birds. While the two are about the same size, *steerei* is a much stockier and more heavily built bird; the bill is much longer, thicker and more strongly decurved; the body color can hardly be called "smoky brown glossed with green;" rather it is bronzy with a strong greenish gloss. While the plumage of the head and neck is that of a typical *Centropus*, harsh with coarse shiny shafts, the rest of the body plumage both above and below is comparatively soft. The hind claw is quite unlike that of *mindorensis*,

rather stout for a *Centropus* and not exceeding the hallux in length (instead of being slender and twice the length of the hallux).

*CENTROPUS MELANOPS MELANOPS* Lesson

Basilan: 15 km. northeast of Maluso, 1 ♀, 1 May, 1937.

The species *melanops* is confined to the more southern islands of the Philippines, recorded from Samar, Leyte, Bohol, Mindanao, Basilan and Nipa. The birds from the first named island have been described as *C. m. banken* Hachisuka.

Stresemann (1939, p. 63-63) considers both *melanops* and *steeri* to be related to *C. sinensis*; in this he would appear to be entirely correct.

*CENTROPUS VIRIDIS VIRIDIS* (Scopoli)

Luzon: near Bangued, 2 ♀, 21 and 26 January.

Mindanao: Zamboanga, 1 ♂, 30 March.

Basilan: 15 km. northeast of Maluso, 1 ♂, 1 imm. ♂, 18 and 25 April, 1937.

I can find no mention of either a seasonal or sexual difference in plumage in this Cuckoo, but unless the two females from Luzon represent an entirely new species, which is most doubtful, it has a plumage change like that of *Centropus toulou* of Madagascar. The wings and tail are precisely like those of a female taken on Samar, 22 June, 1921, but top and sides of head and upper back are brown with pale shaft streaks; the underparts are pale buffy brown narrowly barred with dusky and with pale shaft streaks; there are pale shafts on some of the upper wing coverts and the under wing lining is marked like the underparts. A few black feathers of the breeding plumage are apparent on the nape of each specimen and one has a distinct greenish gloss on the interscapulars.

*CENTROPUS VIRIDIS MINDORENSIS* (Steere)

Mindoro: Pasi, 1 ♂, 1 ♀, 5 and 11 March; Merit, 1 ♂, 6 March; Antipolo, 1 ♂, 11 March; Calawang, 1 ♂, 1 ♀, 9 April and 4 May; Mt. Halcon, 1 ♂, 1 ♀, 20 and 22 April; Ariaod, 1 ♂, 1 ♀, 8 and 14 May; Alsanagon, 1 ♂, 11 May, 1937.

The males are distinctly smaller than the females; the wings of seven of the former sex vary between 146.5 and 159 (average 150.4) and of four females 166.5-174 (average 169.1).

Stresemann (1939, p. 63-64) has shown that *mindorensis* is an allelomorph of *viridis*. The problem is the taxonomic treatment of a genetic case of this sort. If birds of the *mindorensis* type occurred together with *viridis* on Mindoro then it would be incorrect to distinguish them racially. On the other hand it appears that these wholly black allelomorphs occur only on Mindoro and Batan (*C. carpenteri*). On the latter island *viridis* is unrecorded and on the former the single record for *viridis* collected by B. Schmacher in 1890 (Hartert, 1891 A p. 253) is doubted by Hartert in a later publication (1891 B p. 298). Under the circumstances it is convenient to call this apparently homozygous population *C. viridis mindorensis*.

#### CENTROPUS BENGALENSIS JAVANENSIS (Dumont)

Mindoro: Anuling, 1 ♂, 7 April; Carayrayan, 1 ♂, 13 April; Calawang, 2 ♂, 1 ♀, 30 April, 4 May, 1937.

### TYTONIDAE

#### TYTO LONGIMEMBRIS AMAURONOTA (Cabanis)

Luzon: near Bangued, 1 ♀, 27 January, 1937.

I use this subspecific name as one of certain application, since Luzon is the type locality, but knowledge of *Tyto longimembris* is so fragmentary that not even Hartert (1929, pp. 102-104) was able to revise the species satisfactorily.

### STRIGIDAE

#### NINOX SPILOCEPHALA MINDORENSIS

Mindoro: Anuling, 1 ♂, 7 April; Mt. Halcon, 1 ♂, 21 April, 1937.

### CAPRIMULGIDAE

#### EUROSTOPODUS MACROTIS MACROTIS (Vigors)

Mindoro: Pasi, 1 ♂, 4 March; Calawang, 1 ♂, 6 April, 1937.

In Proc. Zool. Soc. London, 1878, p. 945, Tweeddale described *Lyncornis mindanensis* from Mindanao as having the crown, nape, forehead and ear tufts, dark grayish brown and not rufous, browns of the plumage much darker and wings shorter. In Cat. of Birds, British Mus., 16, 1892, p. 605, Hartert recognized Tweeddale's bird; he had

eight specimens of *macrotis* including the type from Manila and three examples of *mindanensis*, the topotypes of that form. However, Grant (1894, p. 519) in reporting on the birds collected in northern Luzon by John Whitehead, found that specimens referable to *mindanensis* occurred with *macrotis* in northern Luzon, and under these circumstances considered the latter to represent younger examples. McGregor followed Grant's reasoning by synonymizing *mindanensis* with *macrotis*, but Hachisuka resurrected it, entirely ignoring Grant's remarks or McGregor's action.

The measurements of specimens, compiled in part from literature, give the following result:

		Wing	Tail
Luzon	1 ♀	290	180 (McGregor)
	—	266-282	163 (Hartert)
Mindoro:	1 ♂	275	170 (McGregor)
	1 ♂	267	180 (specimens in M.C.Z.)
	1 ♀	263	175 (specimens in M.C.Z.)
Mindanao:	—	248-267	162-177 (Hachisuka)
		260-262	163 (Hartert)
Basilan:	1 ♂	276	223 (Bourns and Worcester)

These show that the Mindanao bird does average smaller than birds from Luzon and Mindoro, but that there is a great individual size range; the tail of the Basilan bird is so very long that I cannot help suspecting an error in measurement. Color is quite unreliable, especially whether the crown is rufescent or brownish gray. My belief is that *mindanensis* should remain as a synonym of *macrotis* until more representative series of measurements actually show it to be distinct.

Mayr (1937, p. 7) suggests that *Lyncornis* Gould, April 1838, be united with *Eurostopodus* Gould, April 1838, and that if the former genus is to be recognized at all it should be restricted to the group which includes *cervineps*, *macropterus* and *macrotis*. This group, the members of which are conspecific, is merely the culmination of a small number of species of Australasian Caprimulginae. The *macrotis* Formenkreis is the most specialized of these and has developed a pair of parietal tufts, indications of which are present in other species, *temminckii* for instance. I think it is best to "go the whole hog and sink" *Lyncornis* entirely.

## HEMIPROCNIIDAE

### HEMIPROCNE COMATA MAJOR Hartert

Luzon: Abra Province, 50 km. east of Bangued, 1 ♂, 1 ♀, 3 February, 1937.



## HEMIPROCNE COMATA BARBARAE subsp. nov.

*Type.* M.C.Z. no. 194255, ad. ♂, collected at Bayog, Naujan, Mindoro, Philippine Islands, 2 May, 1937, by Francisco S. Rivera (original no. 294).

*Subspecific characters.* Similar to *H. c. major* Hartert and of about the same size, but back and breast strongly glossed with greenish, instead of being clear bronze brown without greenish wash. Wing measurements of four specimens from Mindoro are as follows:

3 ♂,	133	137.5 (type)	132
1 ♀,	137		

## HEMIPROCNE COMATA NAKAMURAI Hachisuka

Basilan: 15 km. northeast of Maluso, 1 ♂, 19 April, 1937.

This race, the type locality of which is Samal Island off Davao, Mindanao, was separated on the basis of greener back and underparts and size intermediate between *major* and typical *comata*.

2 ♂ Mindanao w. 123, 127

1 ♂ Basilan w. 124

The races of *Hemiprocne comata* and their characters and ranges are:

*a* Back and underparts (except chin and throat) bronze brown

<i>b</i> Size smaller, wing under 130	<i>comata</i>	{ Malay Penin. Sumatra, Borneo Anamba Islands Natuna Islands
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<i>bb</i> Size larger, wing over 130	<i>major</i>	Luzon
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*aa* Back and underparts (except chin and throat) with greenish gloss

<i>b</i> Size larger, wing over 130	<i>barbarae</i>	Mindoro
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<i>bb</i> Size smaller, wing under 130	
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<i>c</i> Abdomen more extensively white and auricular patch of ♂ deeper chestnut	<i>nakamurai</i>	Mindanao Basilan
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<i>ec</i> Abdomen less extensively white and auricular patch of ♂ paler chestnut	<i>stresemanni</i>	Mentawi Islands.
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## APODIDAE

## COLLOCALIA TROGLODYTES Gray

Luzon: Abra Province, San Juan, near Bangued, 3 ♂, 2 ♀, 29 and 30 January; Bucay, 1 ♀, 13 January, 1937.

This distinct species is confined to the Philippines where it has been recorded from most of the principal islands including Palawan; it is not known to occur, however, on any of the islands lying southwestward of Basilan Strait.

#### COLLOCALIA MARGINATA Salvadori

Cebu: Mactan Island, Opon, 1 ♂, 3 ♀, 21 May, 1937.

In using the above name I do so chiefly on the grounds of certainty of application, not with any intention of entering into a discussion as to whether or not the bird is conspecific with *esculenta* or whether there is any such bird as *isonota*. My material is not sufficient to permit such a discussion. Oberholser (1906, p. 203) regarded *marginata* as a distinct species and named *isonota* as a race of *linchi* [*linchi* is currently considered a race of *esculenta*]. Stresemann (1925) regarded *marginata* as a race of *esculenta* and *isonota* as a synonym of *marginata*. Hachisuka calls *marginata* a distinct species and *isonota* a race of *esculenta*, thus reverting to Oberholser's treatment.

The correctness of either view depends on whether the white edgings of the upper tail coverts are of taxonomic value or represent a phase or an age character. I am rather inclined to believe that the former is the case, for there seems to be an average size difference between birds of the *marginata* type and birds of the *isonota* type of marking, at least in the male sex. Wing measurements of the available material follow:

"isonota"	Luzon	♂	97.2,	103.5,	104.5
		♀	98	100.3	
"marginata"	Palawan	♂	91.5		
		♀	98.5		
	Mactan Island	♂	93		
		♀	99, 99, 100		

#### COLLOCALIA FUCIPHAGA AMELIS Oberholser

Marinduque: near Santa Cruz, 1 ♂, 11 March.

Mindanao: Curuan, 50 km. northeast of Zamboanga, 1 ♂, 1 ♀, 4 April.

Cebu: Minganilla Caves, 1 ♀, 23 May, 1937.

Neither Stresemann nor Mayr (1937), the two most recent revisers of Collocalia, has any more than indicated the relationships of the various Philippine Collocalias, all of which were originally described as "species." The four specimens that I identify as *amelis* can, I think, be safely placed in the *fuciphaga* Formenkreis; they have naked tarsi,

rather strong decurved bills, unicolorous backs, wings ranging from 113.7–121.8 and tails forked to a depth of 6.4 to 7.5. It is hardly possible to include them in the *germani* group as Mayr suggests.

#### COLLOCALIA (VESTITA?) MEARNSI Oberholser

Luzon: near Baguio, Mt. Santo Tomas, 1 ♂, 8 January.

Mindoro: Carayrayan, 1 ♂, 13 April, 1937.

These two specimens with partly feathered tarsi and very small weak bills are certainly *mearnsi* whatever that may be. Stresemann was first inclined (1925, p. 184) to consider it a race of *francica*; later (1931) he regarded it as a synonym of the Sumatran *vestita*; Hachisuka likewise synonymizes *mearnsi* with *vestita*. Mayr provisionally calls birds of this type from the Philippines, Borneo and Maratua Island "*mearnsi*" in default of topotypical *vestita*.

In view of the well known tendency of Collocalias to subdivide geographically one would hardly expect *vestita* to occur unchanged in the Philippines.

### TROGONIDAE

#### HARPACTES ARDENS (Temminck)

Basilan: 15 km. northeast of Maluso, 1 ♀, 29 April; near Isabela, 1 ♀, 4 May, 1937.

### ALCEDINIDAE

#### RHAMPHALCYON CAPENSIS GOULDI (Sharpe)

Mindoro: Lake Naujan, 1 ♀, 7 March; Ariaod, 1 ♀, 17 May, 1937.

#### CEYX MELANURA MINDANENSIS Steere

Basilan: 15 km. northeast of Maluso, 1 ♀, 29 April, 1937.

In the absence of topotypical *mindanensis* I can form no independent opinion as to the validity of *Ceyx basilanica* Steere, but follow Bourns and Worcester and subsequent authors in relegating the latter name to the synonymy of the former.

#### CEYX RUFIDORSUS Strickland

Mindoro: Mt. Haleon, 1 ♀, 20 April, 1937.

## CEYX LEPIDUS MARGARETHAE Blasius

Basilan: 15 km. northeast of Maluso, 1 ♂, 25 April, 1937.

This kingfisher is usually described as having the loreal spot and underparts orange-rufous, edge of wing and outer web of first alula quill and first primary, rufous. In the single specimen before me the lores are white, faintly washed with yellowish, bend of wing and outer web of first alula quill and a thin edge on the outer web of the first primary, white; the underparts are washed with pale ochraceous, palest on the throat and darkest on the abdomen.

The plumage variation in this bird is in part responsible for its lengthy synonymy. It was first named from Mindanao by Blasius in the *Braunschweigische Anzeiger* in April 1890; Steere in June 1890 named *bournsii* and *malamaui* from Basilan and in 1905 Grant named *goodfellowi* from Mindanao; this last form is tentatively recognized by McGregor and Hachisuka, but it seems best that it should go into the synonymy of *margarethae* also, in view of the plumage variation shown by this race.

## HALCYON GULARIS (Kuhl)

Luzon: Abra Province, near Bangued, 2 ♂, 1 ♀, 14-22 January.

Mindoro: Pasi, 2 ♀, 7 March; Merit, 1 ♂, 6 March; Ariaod, 2 ♂, 1 ♀, 8 April; Calawang, 2 ♂, 1 ♀, 6-30 April.

Mindanao: Pasonanea River, near Zamboanga, 1 ♂, 2 April, 1937.

## HALCYON CHLORIS COLLARIS (Scopoli)

Mindoro: Subaan, 1 ♀, 12 March; Ariaod, 1 ♂, 1 ♀, 8 April; Calawang, 3 ♂, 1 ♀, 5-9 April; Binugsacan, 1 ♀, 5 May, 1937.

Basilan: 15 km. northeast of Maluso, 1 ♂, 2 ♀, 20 April-1 May; near Isabela 2 ♂, 5 and 6 May, 1937.

## HALCYON WINCHELLI WINCHELLI Sharpe

Basilan: near Isabela, 1 ♂, 5 May, 1937.

This specimen is topotypical and must belong to the nominate form. Hachisuka has named *H. w. nigrorum* from Negros, apparently from a single specimen, using characters that will hardly stand up in a series. The species is peculiar to the Philippines where it occupies the principal islands in the southern half of the Archipelago; Romblon is the northernmost on which it occurs.

HALCYON LINDSAYI LINDSAYI (Vigors)

Luzon: Abra Province near Bangued, 1 ♂, 13 January, 1937.

*Halcyon lindsayi* is confined to the Philippines where it is apparently rare; the typical race occurs on Luzon and is replaced by another subspecies, *moseleyi*, on Negros. The species is unknown on any of the other islands.

MEROPIDAE

MEROPS VIRIDIS AMERICANUS P. L. S. Müller

Mindoro: Anuling, 1 ♀, 11 April; Binugsucan, 3 ♂, 1 ♀, 5 May; Ariaod, 1 ♂, 1 ♀, 9 May, 1937.

CORACIIDAE

EURYSTOMUS ORIENTALIS ORIENTALIS (Linné)

Mindoro: Merit, 1 ♂, 1 ♀, 6 March; Antipolo, 1 ♂, 11 March; Anuling, 1 ♂, 7 April; Carayrayan, 1 ♂, 13 April; Salibagon, 1 ♂, 17 April; Bayog, 1 ♂, 2 May; Ariaod, 1 ♂, 9 May, 1937.

Basilan: 15 km. northeast of Maluso, 1 ♂, 1 ♀, 21-22 April, 1937.

BUCEROTIDAE

PENELOPIDES PANINI MANILLAE (Boddaert)

Luzon: near Bangued, 1 ♀, 30 January, 1937.

In 1903 Finsch named *P. talisi* from Cagayan, Luzon, believing it to differ from *manillae* in having no pale edges to the primaries and in having the rusty tail band much reduced. McGregor tentatively recognized *talisi*, but Hachisuka considers it a synonym of *manillae* and indicates that the character of the tail band varies individually.

PENELOPIDES PANINI MINDORENSIS Steere

Mindoro: Pasi, 2 ♀, 9 March; Calawang, 1 ♂, 9 April; Mt. Halcon, 5 ♂, 3 ♀, 19-25 April, 1937.

Prior to the publication of Meyer and Wiglesworth Birds of Celebes in 1898 the genus *Penelopides* included *Buccros exarhatus* Temminck of Celebes, as well as the members of the *panini* group from the Philippines; Meyer and Wiglesworth created the monotypic genus *Rhab-*

dotorrhinus for the Celebes species, and their genus has been universally accepted until very recently when Stresemann (1936, p. 362) reunited the forms in *Penelopides*. Of course it is difficult in dealing with hornbills to judge to what extent the form of the casque is to be given generic value and to what extent it is merely specific, but in this case I should prefer to keep *Rhabdotorrhinus* for the Celebes bird and restrict *Penelopides* to the *panini* group of the Philippines.

*P. p. mindorensis* is the only race of *panini* in which the ♀ resembles the ♂ in color; all the other forms, of which ten are currently recognized, show a sexual color dimorphism.

#### PENELOPIDES PANINI BASILANICA Steere

Basilan: near Isabela, 1 ♂, 9 May, 1937.

### CAPITONIDAE

#### XANTHOLAEMA HAEMACEPHALA HAEMACEPHALA (P. L. S. Müller)

Luzon: Abra Province, near Bangued, 1 ♂, 2 ♀, 20–28 January.

Mindoro: Pasi, 1 ♂, 5 March; Merit, 1 ♀, 6 March; Subaan, 1 ♀, 12 March;

Bayog, 1 ♂, 2 May, 1937.

The distribution of this form is rather peculiar; it is recorded only from Luzon, Mindoro, Samar, Leyte, and Mindanao, and questionably from Calamianes. On Tablas, Romblon, Masbate, Guimaras, Negros and Cebu it is represented by a bird in which the yellow throat and ocular spots of *haemacephala* are replaced by red. This last form is usually considered to be conspecific with *Xantholaema rosea* of Java and Bali, but it seems much more logical to treat all the red-throated members as races of the yellow throated *haemacephala* as has already been suggested by Bartels and Stresemann (1929, p. 118) and concurred in by Chasen (1935, p. 140).

It is noteworthy that no member of the *haemacephala-rosea* Formenkreis has been recorded from Borneo nor any of the other Philippine Islands except those listed; thus it is absent from some of the larger and more important islands such as Palawan, Panay, Bohol, Basilan and the entire Sulu Archipelago.

### PICIDAE

#### CHRYSOCOLAPTES LUCIDUS MACULICEPS Sharpe

Basilan: 2 ♂, 3 ♀, 15 km. northeast of Maluso, 16 April–1 May, 1937.



This bird was described from Basilan by Sharpe in Trans. Linn. Soc. London, 30, 1877, p. 314, 350 pl. 46, f. 2, but was placed in the synonymy of *C. l. lucidus*, the Mindanao race, by Hargitt in vol. 18, Cat. Birds Brit. Mus., 1890, p. 455-456, where it remained until resurrected by Hachisuka in Bds. Phil. Ids., 2, 1934. Hachisuka, however, compares it with *C. l. haematribon* of Luzon instead of with its nearest relative *C. l. lucidus*, so it is not possible to tell just how the two differ. In default of material of the latter race I use Sharpe's name of certain application without vouching for the validity of *maculiceps*.

DRYOCOPUS JAVENSIS MINDORENSIS (Steere)

Mindoro: Mt. Halcon, 1 ♂, 2 April; Calawang, 1 ♀, 6 April; Carayrayan, 2 ♂, 12 April, 1937.

There seem to be no characters of generic value that would justify the maintenance of the genus *Thriponax* for *Picus javensis*.

DRYOCOPUS JAVENSIS MULTILUNATUS (McGregor)

Basilan: 15 km. northeast of Maluso, 1 ♂, 1 ♀, 26-28 April, 1937.

In McGregor's Man. Phil. Birds, pt. 1, 1909, p. 405, this form falls into that section of the key to the genus *Thriponax* in which the breast is black without light edges to the feathers and rump with a white band; as a matter of fact McGregor in the original description laid special stress on the pale buffy edges of the breast feathers and made no mention of a white rump. In the pair collected by Miss Lawrence the edgings to the breast feathers are neither numerous nor conspicuous, and the rump is without trace of white. It is clear that this key is misleading.

DRYOBATES MOLUCCENSIS VALIDIROSTRIS (Blyth)

Mindoro: Pasi, 1 ♂, 5 March; Subaan, 1 ♂, 12 March; Carayrayan, 1 ♀, 12 April; Mt. Halcon, 3 ♂, 1 ♀, 20-25 April, 1937.

Perhaps the Mindoro race of *Dryobates moluccensis* may prove separable from the topotypical Luzon bird, but I have not sufficient seasonably comparable material from the latter island to decide this point.

DRYOBATES MOLUCCENSIS FULVIFASCIATUS (Hargitt)

Basilan: 15 km. northeast of Maluso, 1 ♂, 2 May, 1937.

## EURYLAIMIDAE

## SARCOPHANOPS STEERII Sharpe

Basilan: 15 km. northeast of Maluso, 3 ♀, 19 April–1 May, 1937.

This interesting species is known only from Dinagat, Mindanao and Basilan.

I have not seen *Sarcophanops samarensis* Steere which is confined to the islands of Samar and Leyte, but the description leads to the conclusion that the differences between it and *steerii* are only those of degree and that trinomials would better express the relationships between the two.

## PITTIDAE

## PITTA ERYTHROGASTRA ERYTHROGASTRA Temminck

Mindoro: Subaan, 1 ♂, 12 March; Bayog, 2 ♀, 10 April and 2 May, 1937.

•  
HIRUNDINIDAE

## HIRUNDO RUSTICA GUTTURALIS Scopoli

Mindoro: Pasi, 1 ♂, 11 March, 1937.

## HIRUNDO TAHITICA ABBOTTI Oberholser

Mindoro: Salibagon, 1 ♀, 17 April, 1937.

## CAMPEPHAGIDAE

## CORACINA STRIATA MINDORENSIS (Steere)

Mindoro: Pasi, 1 ♂, 1 ♀, 4 March; Merit, 1 ♀, 6 March; Ariaod, 1 ♂, 1 ♀, 8 April; Mt. Halcon, 2 ♂, 3 ♀, 22–29 April, 1937.

I can see no reason for maintaining both *Artamides* and *Coracina* as distinct genera. *Coracina* Vieillot is of course not preoccupied by *Coracinus* Pallas; hence *Graucalus* Cuvier becomes an objective synonym of *Coracina*, both having the same type.

## EDOLISOMA MORIO ELUSUM McGregor

Mindoro: Mt. Halcon, 2 ♂, 1 ♀, 19–28 April, 1937.

## EDOLISOMA MORIO MINDANENSE (Tweeddale)

Basilan; 15 km. northeast of Maluso, 1 ♂, 15 April, 1937.

## LALAGE MELANOLEUCA MELANOLEUCA (Blyth)

Mindoro: Bayog, 1 ♀, 10 April; Mt. Halcon, 3 ♂, 1 ♀, 19-28 April, 1937.

## LALAGE NIGRA CHILENSIS (Meyen)

Luzon: near Bangued, 2 ♂, 1 ♀, 17-25 January.

Mindoro: Binugsucan, 1 ♀, 5 May.

Mindanao: Zamboanga, 1 ♀, 30 March, 1937.

Until 1922 the common Philippine Lalage was considered to be the same as the bird found in southeastern Asia and the Sunda Islands, but in that year Bangs differentiated the Philippine bird by reason of its larger size under the name of *Lalage nigra mirifica*. Three years before, however, Neumann had named a bird supposed to have been taken on Culion as *Lalage schisticeps*, and this name was adopted by Hachisuka in 1935 as the subspecific name of the Philippine race of *Lalage nigra*. However, Stresemann had already pointed out (Orn. Monatsb., 30, 1922, p. 88 and *Id.*, 38, 1930, p. 19) that the type of *schisticeps* was an artefact, made up of the body of *Lalage nigra* and the head of *Pericrocotus divaricatus* and in Orn. Monatsb., 38, 1930, p. 19, published a note to the effect that the type of *Ceblepyris chilensis* Meyen, 1834, was in the Berlin Museum; that it did not come from Chile as Meyen supposed but came from Manila, Luzon, and was the same as the bird later named by Bangs. But if there was no prior name, Bangs' name *mirifica* would hold over Neumann's *schisticeps* since the latter is based on an artefact.

## DICRURIDAE

## DICRURUS BALICASSIUS BALICASSIUS (Linné)

Mindoro: Pasi, 3 ♂, 4-11 March; Anuling, 3 ♂, 7-11 April; Ariaod, 1 ♀, 8 April; Bayog, 1 ♀, 10 April; Mt. Halcon, 4 ♂, 1 ♀, 19-28 April, 1937.

I use the trinomial for these birds since it appears that *balicassius* is conspecific with *annectans*. It might be proper to identify these specimens as *D. balicassius mindorensis* Mearns, but this race has been synonymized with the typical form by McGregor and I have only Mindoro birds available and no topotypical skins from Luzon for comparison.

## DICRURUS HOTTENTOTTUS STRIATUS Tweeddale

Basilan: 15 km. northeast of Maluso, 1 ♂, 1 ♀, 20 and 27 April, 1937.

## ORIOLIDAE

## ORIOLUS CHINENSIS CHINENSIS Linné

Luzon: near Bangued, 2 ♂, 1 ♀, 21-25 January.

Mindoro: Pasi, 1 ♂, 2 ♀, 4-8 March; Calawang, 2 ♂, 3 ♀, 7-30 April; Ariaod, 1 ♂, 16 April; Casungo, 2 ♀, 1 May; Alsanagon, 1 ♂, 11 May.

Basilan: 15 km. northeast of Maluso, 1 ♀, 17 April, 1937.

This is the *Oriolus acrorhynchus* Vigors of McGregor's "Manual." Meinertzhagen, however, has shown (1923, p. 72) that *Oriolus cochinesis* of Brisson, 2, p. 326, pl. 33, fig. 1, the exclusive basis of Linné's *Oriolus chinensis*, agrees more nearly with this form than with any other of the group, and adopts it, substituting Manila as the type locality in place of China, erroneously given by Linné.

## ORIOLUS XANTHONOTUS BASILANICUS Ogilvie-Grant

Basilan: 15 km. northeast of Maluso, 2 ♀, 17 and 26 April; Isabela, 1 ♂, 6 May, 1937.

The distribution of *O. xanthonotus* in the Philippines is peculiar; *O. x. consobrinus* Wardl.-Rams. extends from Borneo to the Palawan group; the species is absent from Luzon, Mindoro and the lesser adjacent islands but recurs in the southern half of the Archipelago with *O. x. samarensis* Steere on Samar and Leyte, *O. x. steeri* Sharpe, Masbate and Negros, *O. x. basilanicus* Og. Gr., Mindanao and Basilan, *O. x. cinereogenys* Bourns and Worcester on Bongao and Tawi Tawi in the Sulas and *O. x. assimilis* Tweeddale is found on Cebu.

## CORVIDAE

## CORVUS CORONOIDES PHILIPPINUS Bonaparte

Mindoro: Pasi, 1 ♂, 5 March; Ariaod, 1 ♂, 8 April; Casungo, 1 ♀, 1 May, 1937.

## CORVUS ENCA PUSILLUS Tweeddale

Mindoro: Pasi, 2 ♀, 10 and 11 March; Subaan, 1 ♂, 1 ♀, 12 March; Bayog, 2 ♀, 10 April; Calawang, 1 ♂, 1 ♀, 4 May; Ariaod, 1 ♀, 7 May; Alsanagon, 1 ♂, 11 May, 1937.

## PARIDAE

## PARUS ELEGANS MONTIGENUS (Hachisuka)

Luzon: Baguio, 1 ♂, 1 ♀, 8 and 9 January, 1937.

This race of the Elegant Titmouse was described by Hachisuka in Suppl. Publ. No. 14, Orn. Soc. Japan, 1930, p. 200, with type from Haight's Place, 2469 metres, 56 km. from Baguio, Mountain Province, Luzon. According to Hachisuka, this is a mountain form, true *elegans* being confined to the lowlands of Luzon and presumably the lowlands of some of the other islands. According to its describer *montigenus* is supposed to differ from the typical form in having smaller white spots on the back and wing coverts and "underpart of the body yellow less bright sulphery shine." Miss Lawrence's birds agree with three adults from Baguio collected by W. C. Forbes and all differ from a single old specimen purporting to come from Manila in just the characters pointed out by Hachisuka.

I have examined Lafresnaye's type of *Parus quadrivittatus* and while that name certainly does not apply to Hachisuka's new race, the type should be compared with some of the other Philippine races of *Parus elegans* (nine are enumerated by Hachisuka), not one of which has ever been compared with the type of *Parus quadrivittatus*.

## SITTIDAE

## CALLISITTA FRONTALIS MESOLEUCA (Ogilvie-Grant)

Luzon: near Baguio, 1 ♂, 1 ♀, 6 and 8 January, 1937.

## CALLISITTA FRONTALIS LILACEA (Whitehead)

Basilan: near Isabela, 1 ♂, 6 May, 1937.

## CERTHIIDAE

## RHABDORNIS MYSTACALIS MINOR Ogilvie-Grant

Basilan: 15 km. northeast of Maluso, 1 ♂, 1 ♀, 18 and 20 April, 1937.

## TIMELIIDAE

## MINODORIA STRIATICEPS STRIATICEPS (Sharpe)

Basilan: 15 km. northeast of Maluso, 2 ♂, 2 and 3 May, 1937.

Hachisuka erected the genus *Minodoria* for *Macronus striaticeps*, leaving *Macronus* for *Macronus pilosus* of the Malay Peninsula, Sumatra and Borneo. In so doing he appears to be entirely correct; no doubt the two genera are related as evidenced by the remarkable modification of the interscapulars in both species, but *Macronus* not only shows this modification to a greater degree, but possesses a similar tuft of feathers arising from each side of the breast; in addition the plumage is more decomposed and the lores are nearly naked.

#### ZOSTERORNIS WHITEHEADI Ogilvie-Grant

Luzon: Kalinga Province, Balbalasang, 35 km. west of Lubuagan, 2 ♂, 6 February; Mountain Province, Mt. Santo Tomas, 1 ♂, 14 February, 1937.

### PYCNONOTIDAE

#### IRENA CYANOASTRA MELANOCHLAMYS Sharpe

Basilan: 15 km. northeast of Maluso, 1 ♂, 1 not sexed, 16 and 25 April, 1937.

#### IOLE RUFIGULARIS (Sharpe)

Mindanao: Zamboanga, 1 ♂, 2 April.

Basilan: 15 km. northeast of Maluso, 1 ♂, 21 April, 1937.

This species is confined to Mindanao and Basilan and might be considered a member of the *gularis* group if the two did not occur together on Mindanao. *I. rufigularis* is readily told from its congener by slightly greater size and by its lack of narrow white shaft stripes on the throat.

#### IOLE GULARIS MINDORENSIS (Steere)

Mindoro: Pasi, 5 ♂, 1 ♀, 4-11 March; Calawang, 2 ♂, 1 ♀, 6-9 April; Anuling, 2 ♂, 7 April; Carayrayan, 1 ♀, 13 April; Bayog, 1 ♂, 10 April; Mt. Halcon, 3 ♂, 1 ♀, 18-21 April, 1937.

The earliest specific name for the species known as *Iole gularis* is *Turdus philippensis* Gmelin 1789, but it is preoccupied twice over by *Turdus philippensis* of Müller 1776, and of Boddaert 1783.



## PYCNONOTUS GOIAVIER GOIAVIER (Scopoli)

Mindoro: Pasi, 1 ♂, 2 ♀, 4 March; Antipolo, 1 ♂, 11 March; Calawang, 2 ♂, 3 and 6 April; Carayrayan, 3 ♂, 13 April, 1937.

My topotypical material of this form from Luzon is unsatisfactory, but the Mindoro series collected by Rivera gives the following wing and tail measurements:

	Wing	Tail
♂	84	82
	83	77
	86	83.5
	77	76
	80	80
	79	77
♀	77	77
	79	77.5

## PYCNONOTUS GOIAVIER SULUENSIS Mearns

Mindanao: Zamboanga, 4 ♂, 28 March-5 April, 1937.

This form was described by Mearns with type from Sulu and attributed by him to Basilan and Mindanao in addition. The characters were relatively shorter tail, broader white supraorbital stripes and paler auricular patch. There certainly is nothing diagnostic about the tail measurements; the three adult males in this series measure as follows:

wing 83.5	tail 77.5
81.5	78
84	81

The same three specimens all uphold the character of broader supraorbital stripes and paler auricular patch; in addition the antecular spot seems to be more extensive.

## TURDIDAE

## CALLIOPE CALLIOPE (Pallas)

Luzon: Lagangilang, 1 ♂, 28 January, 1937.

## MONTICOLA SOLITARIA PHILIPPENSIS (P. L. S. Müller)

Luzon, Mt. Santo Tomás, 1 ♂, 8 January; Lagangilang, 1 ♂, 1 ♀, 25 and 28 January, 1937.

## COPSYCHUS MINDANENSIS (Boddaert)

Luzon: Lagangilang, near Bangued, 2 ♂, 2 ♀, 18-27 January.

Mindoro: Calawang, 1 ♂, 1 ♀, 14 April.

Mindanao: Zamboanga, 2 ♂, 30 March and 12 April.

Basilan: 15 km. northeast of Maluso, 1 ♀, 19 April, 1937.

In spite of its wholly black tail, it would probably not be incorrect to regard this species as the Philippine representative of the *Copsychus saularis* group.

## SAXICOLA CAPRATA CAPRATA (Linné)

Luzon: Lagangilang, near Bangued, 1 ♂, 14 January, 1937.

## SYLVIIDAE

## CISTICOLA EXILIS RUSTICA Wallace

Mindoro: Binugsucan, 2 ♂, 1 ♀, 5 May, 1937.

With ample material Lynes was unable to distinguish any geographic races of *Cisticola exilis* from the Moluccas, Celebes and the Philippines, but united them all under Wallace's *rustica*, the type of which came from Buru. Should the Philippine bird prove separable *Cisticola semirufa* Cabanis, based on a specimen from Luzon, is available.

## LOCUSTELLA FASCIOLATA Gray

Basilan: 15 km. northeast of Maluso, 1 ♂, 21 April, 1937.

This species, which breeds in eastern Siberia, has not been previously taken on Basilan, though it winters as far east as the Moluccas and has been recorded from many islands in the Philippines.

## MEGALURUS PALUSTRIS FORBESI Bangs

Mindoro: Pasi, 1 ♀, 4 March; Bayog, 1 ♀, 2 May; Calawang, 1 ♂, 4 May; Binugsucan, 2 ♂, 1 ♀, 5 May.

Mindanao: Zamboanga, 1 ♂, 30 March, 1937.

The resident race of the Striated Grass Warbler shows little or no variation; in addition to the specimens listed above, I have examined 3 ♂ (including the type) and 2 ♀ from Luzon, and 1 ♂ each from Panay and Samar. I can detect no appreciable color differences and the

size range is negligible, as can be seen from the following wing measurements:

Males: Luzon, 95.5, 96, 98; Mindoro, 94, 95, 98.5; Panay, 94; Samar, 96; Mindanao, 95.5.

Females: Luzon, 84, 87; Mindoro, 85, 86, 87.

*PHYLLOSCOPUS BOREALIS BOREALIS* (Blasius)

Luzon: Lagangilang, near Bangued, 1 ♂, 1 ♀, 17 and 28 January.

Mindoro: Pasi, 1 ♂, 5 March; Mt. Halcon, 1 ♂, 1 ♀, 18 and 21 April, 1937.

*PHYLLOSCOPUS BOREALIS XANTHODRYAS* Swinhoe

Luzon: Baguio, 1 ♂, 6 January.

Mindoro: Calawang, 1 ♂, 5 April, 1937.

Apparently the Mindoro specimen constitutes the first record for the eastern race of the Willow Warbler from that island, a fact that may be of local interest but of no special significance, since this race has been recorded from islands both north and south of Mindoro.

*CRYPTIGATA NIGRORUM NIGRORUM* Moseley

Luzon: Baguio, 1 ♂, 6 January, 1937.

I have no topotypical material from Negros for comparison.

*HOREITES CANTANS BOREALIS* (Campbell)

Luzon: Lagangilang, near Bangued, 1 ♂, 31 January, 1937.

This specimen belongs to the pale northern form of the Bush Warbler which breeds in Ussuriland, Manchuria and Korea. McGregor records examples of this species (under name of *Horornis canturians*) from Apo, Calayan and Luzon, but without a reexamination of the skins it is of course impossible to tell to what subspecies they belong. Hachisuka records a specimen from northern Luzon under the name of *Horornis canturians taiwanorum* Hachisuka, a name that certainly must go into the synonymy of *borealis*.

*ORTHOTOMUS FRONTALIS FRONTALIS* Sharpe

Mindanao: Zamboanga, 1 ♀, 28 March, 1937.

## ORTHOTOMUS FRONTALIS MEARNSI McGregor

Basilan: 15 km. northeast of Maluso, 1 ♀, 17 April; near Isabela, 1 ♀, 10 May, 1937.

## ORTHOTOMUS CINEREICEPS Sharpe

Basilan: 15 km. northeast of Maluso, 1 imm. ♀, 21 April, 1937.

## ORTHOTOMUS CHLORONOTUS Ogilvie-Grant

Luzon: Lagangilang, near Bangued, 1 ♂, 1 ♀, 14 January, 1937.

The reference to the original description as given both in Sharpe's Hand-list and in McGregor's Manual is wrong; the correct citation is Bull. Brit. Orn. Cl., 5 (not 3), 31 Oct. 1895, p. ii (not 2).

I am strongly of the opinion that this so-called species will eventually be regarded as a race of *O. sericeus* Temminck and would even treat it as such were it not for *O. derbianus* Moore, a Luzon form that I have not been able to examine, but which from the description is certainly one of the *sericeus* group. Until the distribution of the two forms on Luzon is known it is of course necessary to accord one of them specific rank. In a short review of the *O. sericeus* (= *ruficeps* of authors) group Oberholser (1932, p. 86-90) describes as a new race *O. s. eupolius* from Sibutu Island, Philippines; this form, however, was described by Bangs (1922, p. 82) as *O. ruficeps nuntius* based chiefly on Sibutu specimens but with type from Cagayan Sulu. Specimens from Palawan and Culion do not differ appreciably from true *sericeus* of Borneo, and a single skin of an immature bird from Jolo is also apparently referable to the typical form. The other Philippine race that should be included in the *sericeus* Formenkreis is *O. castaneiceps* Walden which inhabits the islands of Bantayan, Guimares, Masbate, Negros, Panay and Ticao.

## MUSCICAPIDAE

## HEMICHELIDON GRISEISTICTA Swinhoe

Luzon: Lagangilang, near Bangued, 1 ♂, 17 January.

Mindoro: Pinamalayan, 1 ♂, 9 March, Subaan, 1 ♀, 14 March; Mt. Halcon, 1 ♂, 1 ♀, 21 April.

Basilan: 15 km. northeast of Maluso, 1 ♂, 1 ♀, 21 and 29 April, 1937.

This species breeds in eastern Asia and winters from the Philippines to New Guinea. Parrot (1907, p. 168) named *H. g. habereri* from the Kurile Islands, but this proposed form has been universally synony-

mized. Hachisuka has recently referred three unusually large specimens from the Philippines to this race, but present evidence does not warrant its recognition.

CYORNIS BECCARIANA SIMPLEX Blyth

Luzon: Lagangilang, near Bangued, 3 ♀, 13-27 January, 1937.

This form was believed by its describer to have come from Borneo, but Robinson and Kinnear (1928, p. 246) have shown this to be an error and substituted Luzon as the correct type locality.

CYORNIS BECCARIANA PHILIPPENSIS Sharpe

Mindanao: near Zamboanga, 1 [♀], 2 April, 1937.

CYORNIS BECCARIANA MINDORENSIS Mearns

Mindoro: Calawang, 1 ♀, [= ♂], 6 April; Anuling, 1 ♀, 7 April; Mt. Halcon, 1 ♀, 24 April, 1937.

At least four races of *C. beccariana* occur in the Philippines; Stresemann has named the Palawan race *littoralis*, but Robinson and Kinnear provisionally synonymize it with true *beccariana*. I have not seen it. The Luzon form, *simplex*, is a rather pale race, both sexes show the light blue supraloral stripe conspicuously; *simplex* is also said to occur on Marinduque. With the exception of Palawan, Luzon, Marinduque and Mindoro, the Philippines are inhabited by *philippensis*; this race is somewhat more richly colored than *simplex* and the supraloral band less conspicuous; adequate series from the numerous islands on which this race occurs might show the need for additional subdivision. *C. b. mindorensis* is a richly colored race, darker blue above and deeper and more extensively orange rufous below.

HYPOTHYMIS AZUREA AZUREA (Boddaert)

Luzon: Lagangilang, near Bangued, 1 ♀, 21 January.

Mindoro: Merit, 2 ♂, 1 ♀, 6 March; Pasi, 1 ♂, 10 March; Subaan, 1 ♀, 12 March; Anuling, 2 ♂, 1 ♀, 7 April; Carayrayan, 1 ♂, 1 ♀, 13 April; Mt. Halcon, 3 ♂, 20 April, 1937.

HYPOTHYMIS AZUREA COMPILATOR subsp. nov.

Mindanao: near Zamboanga, 1 - [= ♀], 2 April.

Basilan: 15 km. northeast of Maluso, 1 ♂, 23 April; near Isabela, 1 ♂, 6 May, 1937.

*Type:* Museum of Comparative Zoölogy, no. 194555; adult ♂, from 15 km. northeast of Maluso, Basilan, Philippine Islands. Collected 23 April, 1937, by Barbara Lawrence. Original no. 652.

*Characters.* Similar to *H. a. azurea* (Boddaert) but white area of abdomen more extensive. Similar also to *H. a. leucophila* Oberholser of the Pagi Islands, but darker and more purplish blue. (The ♀ *leucophila*, however, is very different from any of the females of the Philippine forms.)

After examining a considerable series of *H. azurea* from the Philippines I think the description of this new form is advisable and that the single rather striking character relied on for its separation is geographic and not individual; it is apparent not only in three males from Basilan but in three males from Mindanao (U.S.N.M.) Basilan, and a male from Samar (M.C.Z.), while not one of the Mindoro series has it. Three topotypical Luzon males kindly loaned by the U. S. National Museum agree with the Mindoro birds as do specimens from Guimaras (M.C.Z. and U.S.N.M.) and Panay (U.S.N.M.). I am sorry to have to leave in abeyance the question of subspecific identity of the birds upon so many islands of the Archipelago whence specimens do not seem to be available at present, but take this occasion to point out that the birds of the Palawan group, at least Palawan (M.C.Z. and U.S.N.M.) and Balabac (U.S.N.M.), are nearer to *H. a. prophata* of Borneo than to the typical race of the northern Philippines. *Prophata* has the posterior underparts in the ♂ almost entirely washed with bluish and the ♀ has the head less intensely blue and the throat decidedly washed with grayish; on the whole the Palawan birds should be referred to *prophata*.

*Muscicapa azurea* Boddaert is based solely on Le Petit Azur of Buffon, 8 (12mo ed.), p. 329, and on Daubenton Pl. enlum., pl. 666, fig. 1, where the species described by Buffon is figured as "Gobemouche bleu, des Philippines." The type locality therefore is the Philippine Islands and I cannot find that it has been further restricted. Since it now becomes necessary to do so, I designate Manila, Luzon, Philippine Islands, as the type locality. Daubenton's plate shows a bird with an extensively white abdomen and it might be argued that it applies to the bird here described as new, but reference to Buffon's text distinctly mentions the wash of blue extending over the abdomen, and it may be safely assumed that the plate is inaccurately colored.



## CYANOMYIAS COELESTIS

Basilan: 15 km. northeast of Maluso, 1 ♂, 23 April, 1937.

A fine specimen of this rare flycatcher.

## GERYGONE FUSCA SULPHUREA Wallace

Mindanao: Zamboanga, 1 ♂, 1 ♀, 28 and 30 March, 1937.

This wide ranging form inhabits the Malay Peninsula, southern Siam, Sumatra, Engano, Java, Banka, southern Borneo, the Philippines (including the Sulu Archipelago, but excluding Palawan) and the chain of the Lesser Sunda Islands eastward to Alor. Several races have been named within this range including *simplex* Cabanis and *rhizophorae* Mearns both from the Philippines, but Meise (1930, pp. 371-372) who has carefully revised the entire genus is unable to discover any constant racial characters within the wide area outlined above. If *rhizophorae* is ever recognized, Miss Lawrence's two specimens must be referred to it, since they are topotypes.

## RHIPIDURA SUPERCILIARIS SUPERCILIARIS (Sharpe)

Basilan: 15 km. northeast of Maluso, 1 ♂, 30 April; near Isabela, 1 ♂, 4 May, 1937.

This species was originally described as a *Hypothymis* and for many years was placed in that genus, but except for its blue color, such a generic allocation was hardly justified. McGregor in 1909 removed it to *Rhipidura*. Two years later Oberholser (1911, p. 587) made *H. superciliaris* the type of a new genus *Cyanonympha*, but in my opinion this was unnecessary; removing it to *Rhipidura* being sufficient to convey a proper idea of its systematic position.

## RHIPIDURA CYANICEPS CYANICEPS (Cassin)

Luzon: Baguio, 2 ♂, 1 ♀, 6 and 7 January, 1937.

This form is known only from Luzon; on Tablas it is replaced by an allied race *R. c. sauli* Bourns and Worcester. A related species *R. albiventris* Sharpe occurs on Masbate, Ticao, Panay, Guimaras, Negros. It is difficult to account for the absence of representative forms of *R. cyaniceps* from so many of the other principal islands in the Philippines.

## RHIPIDURA JAVANICA NIGRITORQUIS Vigors

Luzon: Lagangilang, near Bangued, 1 ♂, 14 January, 1937.

## RHINOMYAS RUFICAUDA RUFICAUDA (Sharpe)

Basilan: 15 km. northeast of Maluso, 1 ♀, 1 sex not determined, 16 and 25 April, 1937.

*R. ruficauda* is confined to the mountains of northern Borneo where it is represented by a race on Mt. Dulit and another on Mt. Kina Balu, and to the southern Philippines where *samarensis* inhabits Samar, Bohol, Leyte and Mindanao, *ruficauda* Basilan and *ocularis* some of the islands of the Sulu Archipelago.

## CULICICAPA HELIANTHEA PANAYENSIS (Sharpe)

Luzon: Baguio, 2 ♀, 5 and 7 January, 1937.

Luzon specimens differ from true *helianthea* of Celebes in being slightly more yellowish green above and the bright yellow band across the rump more extensive and sharply contrasted with the lower back; tail relatively shorter. There is also a difference in the color of the bill and feet; in skins *h. helianthea* has a brown upper mandible and pale legs and feet, while *h. panayensis* has a black upper mandible and brown legs and feet. Meyer and Wiglesworth (1, 1898, p. 387) quote Everett as authority for the statement that the Celebes bird has the upper mandible "dark sepia" and legs and feet light sepia, while McGregor gives black for the mandible and dark brown for feet and legs of the Philippine race.

## STOPAROLA PANAYENSIS NIGRIMENTALIS Ogilvie-Grant

Luzon: below Baguio at elevation of 2500 feet, 1 not sexed, 5 January, 1937.

## MOTACILLIDAE

## MOTACILLA CINEREA CASPICA (Gmelin)

Luzon: Baguio, 1 ♀, 7 January; Mt. Santo Tomás, 1 ♀, 16 February, 1937.

## MOTACILLA FLAVA SIMILLIMA (Hartert)

Mindoro: Calawang, 1 ♂, 1 ♀; 14 April, 1937.

This form of the Gray-headed Wagtail breeds in Kamchatka and the northern Kurile Islands.

## MOTACILLA FLAVA ALASCENSIS &gt; &lt; PLEXUS

Mindoro: Casungo, 2 ♂, 1 May, 1937.

No one has made any serious effort at the subspecific allocation of the migrant individuals of *Motacilla flava* occurring in winter in the Philippines, since the publication of Sushkin's revision of this group (1925, pp. 30-37). There are two specimens in the M.C.Z. taken in Benguet Province, Luzon, by Governor General Forbes in the spring of 1913; these were examined by Sushkin and referred to *simillima*; a specimen from Lake Liguason, Mindanao, also taken by Governor General Forbes in the spring of 1913 was likewise identified by Sushkin as *simillima*.

The two Calawang, Mindoro birds are clearly identifiable as *simillima*; the ear coverts are little darker than the crown, there is a well defined white eyebrow from the base of the bill to the occiput and the dusky spots on the throat are not arranged in the shape of a collar. The two specimens listed herewith from Casungo, Mindoro, are not as readily disposed of. They are not birds with gray ear coverts like *simillima* or *alascensis* but with blackish ear coverts like *plexus* or *thunbergi*; the eyebrow is narrower than in *simillima*, more as in *alascensis*; the dusky spots on throat are better developed forming a rough band or collar just as in *alascensis*. I am inclined to think that these birds represent a breeding population from somewhere in north-eastern Siberia between the ranges of *plexus* (which breeds at least east to the mouth of the Kolyma) and *alascensis* (breeds on the Chukchi Peninsula). I have seen no specimen of *tairanus* from the Philippines. McGregor uses the name *leucostriatus* of Homeyer 1878 (= *tairanus* Swinhoe) for the birds of this sort, but his description is obviously taken from *simillima* or a closely allied race, since he lays particular stress on the "long white supercilium"; *tairanus* has a clear yellow eyebrow.

## ANTHUS HODGSONI HODGSONI Richmond

Luzon: Baguio, 1 ♀, 2 not sexed, 3-7 January, 1937.

Hartert and Steinbacher (1933, pp. 137-138) place *A. h. berezowskii* Zarud. and *A. h. yunnanensis* Kuroda and Uchida in the synonymy of the nominate form, and themselves describe *A. h. innominatus* as the race of northeastern Asia. Since the three specimens taken by Miss Lawrence are of the heavily marked type they cannot be *innominatus*, which is characterized by weak streaking both above and below.

## ARTAMIDAE

## ARTAMUS LEUCORYN LEUCORYN (Linné)

Luzon: Lagangilang, near Bangued, 2 ♂, 2 ♀, 19 and 28 January.

Mindoro: Pasi, 3 ♂, 1 ♀, 5 March; Calawang, 1 ♀, 6 April; Anuling, 1 ♀, 11 April; Binugsucan, 1 ♀, 5 May, 1937.

Many of the specific names, such as this one, in Linné's "Mantissa" were abbreviated in order not to have the last syllable come on the line below. It has been customary for authors to write these names out in full, but there is nothing in the International Code that would sanction this practice. "The original orthography of a name is to be preserved unless an error of transcription, a *lapsus calami* or a typographical error is evident." An abbreviated name does not fall into any of these categories.

## STURNIDAE

## SARCOPS CALVUS CALVUS (Linné)

Luzon: Lagangilang, near Bangued, 1 ♀, 22 January.

Mindoro: Pasi, 2 ♂, 1 ♀, 4-7 March; Calawang, 1 ♂, 2 ♀, 6-9 April; Anuling, 1 ♂, 1 ♀, 7 April; Bayog, 1 ♂, 2 ♀, 10 April; Mt. Halcon, 1 ♂, 1 ♀, 24 and 25 April; Ariaod, 2 ♂, 8 May, 1937.

## SARCOPS CALVUS MELANONOTUS Ogilvie-Grant

Basilan: 15 km. northeast of Maluso, 2 ♂, 20 April, 1937.

It is rather difficult to decide from the written evidence as well as from fresh material just what the status of *melanonotus* is. According to Ogilvie-Grant birds of the *calvus* type, *i.e.*, with entirely silvery gray upper parts from neck to upper tail coverts inhabit the Philippines westward of long. 122°E and the *melanonotus* style, *i.e.*, with the silvery color of the upper parts interrupted by a black area across the back, are found chiefly east of long. 122°. According to McGregor both forms have been found in Luzon and Bohol. Reference to his list of localities under each form shows both attributed to Basilan, Marinduque, Mindanao and Tablas as well.

The Luzon specimen taken by Miss Lawrence and the Mindoro series collected by Rivera are clearly *S. c. calvus*, and Miss Lawrence's two skins from Basilan are surely referable to *melanonotus*. In addition the M.C.Z. possesses eight other skins of this species. Two of

these, both from Luzon (Manila and Irisan), are *calvus* plainly enough. The remaining six, all of which must be referred to *melanonotus* are distributed as follows: 1 ♀, Lubang (northwest of Mindoro); 1 ♂, Samar; 1 ♂, 1 ♀, Darsena Island (one of "Los Naranjos" lying about 22 km. due south of the southeastermost extremity of Luzon); 1 ♂, Guimaras; 1 ♂, Basilan.

I am rather inclined to the belief that *melanonotus* is not really a geographical race in the true sense, but that on certain islands there is a tendency to the production of "melanistic mutants," which really accounts for two forms occurring on the same island.

#### ÆTHIOPSAR CRISTATELLUS CRISTATELLUS (Linné)

Luzon: Lagangilang, near Bangued, 1 ♀, 29 January, 1937.

#### APLONIS PANAYENSIS PANAYENSIS (Scopoli)

Mindoro: Anuling, 1 ♂, 6 May.

Basilan: 15 km. northeast of Maluso, 1 imm. ♂, 2 ad. ♀, 17-29 April, 1937.

### LANIIDAE

#### LANIUS SCHACH NASUTUS Scopoli

Luzon: Lagangilang, near Bangued, 1 ♀, 25 January.

Mindanao: Zamboanga, 1 ♂, 12 April, 1937.

#### LANIUS CRISTATUS LUCIONENSIS Linné

Luzon: Lagangilang, 2 ♂, 2 ♀, 14-29 January.

Mindoro: Pasi, 1 ♂, 4 March; Merit, 1 ♂, 6 March; Calawang, 2 ♀, 6 and 9 April; Anuling, 1 ♂, 11 April; Paltabaan, 1 ♂, 15 April; Ariaod, 1 ♀, 9 May.

Mindanao: Zamboanga, 1 ♂, 3 March, 1937.

This is a rather unsatisfactory series for positive subspecific identification of every skin because of a large proportion of immature or sub-adult birds and the fact that the Mindoro specimens are molting badly. Strangely enough the Mindanao bird has already completed the molt and is in fine fresh feather.

## HYLOTERPE (PHILIPPENSIS?) ALBIVENTRIS Ogilvie-Grant

Luzon: Baguio, 1 ♂, 1 ♀, 7 January, 1937.

According to Hachisuka (1930, p. 199) *H. albiventris* is the Luzon highland representative of *H. philippensis* which is also restricted to Luzon. I have insufficient available material of any of the Philippine forms of *Hyloterpe* to form the basis for discussion of their affinities, but incline to the belief that *albiventris* is not conspecific with *philippensis*. I maintain the genus *Hyloterpe* only tentatively; it is now merged with *Pachycephala* by many authors, but perhaps it would be better to await a revision of *Pachycephala* and allied genera before definitely lumping *Hyloterpe*.

## HYLOTERPE (PHILIPPENSIS?) MINDORENSIS Bourns and Worcester

Mindoro: Pasi, 1 ♂, 4 March, 1937.

The single specimen taken by Rivera differs from *albiventris* (with which it is synonymized by McGregor) in just the characters pointed out by Bourns and Worcester (1894, p. 22) in their original description. It is a much browner bird than *albiventris*; the crown is brown without trace of olive green, the back is olive brown; outer webs of secondaries and secondary coverts reddish brown and undertail coverts darker and more buffy. If *albiventris* is regarded as specifically distinct from *philippensis*, then *mindorensis* must be considered a race of the former.

## HYLOTERPE PHILIPPENSIS APOENSIS Mearns

Basilan: 15 km. northeast of Maluso, 1 ♀, 26 April; near Isabela, 2 ♂, 5 and 7 May, 1937.

Lacking topotypical material of *apoensis* I follow McGregor in referring Basilan birds to that race and in regarding *basilanica* of Mearns as a synonym.

## ZOSTEROPIDAE

## ZOSTEROPS PALPEBROSA BASILANICA Steere

Basilan: 15 km. northeast of Maluso, 1 ♀, 18 April, 1937.

## ZOSTEROPS JAPONICA MEYENI Bonaparte

Luzon: Baguio, 1 ♀?, 6 January, 1937.



## ZOSTEROPS NIGRORUM AUREILORIS Ogilvie-Grant

Luzon: Lagangilang, near Bangued, 2 ♂, 1 ♀, 14-21 January, 1937.

In allocating these three forms of *Zosterops* to their specific groups I have followed Stresemann (1931).

## DICAЕIDAE

## DICAЕUM RETROCINCTUM Gould

Mindoro: Merit, 1 ♂, 6 March; Subaan, 2 ♂, 1 ♀, 14 March; Calawang, 1 ♂, 6 April; Mt. Halcón, 2 ♂, 18 and 27 April, 1937.

This very distinct species is confined to Mindoro as far as known. The type is said to be from Manila but the species has not since been taken on Luzon and it is quite probable that the type never came from Luzon.

Hachisuka (1930, p. 207) believes this to be the northern representative of *D. haematosticta*, but I am unable to accept this view.

## DICAЕUM PAPUENSE PAPUENSE (Gmelin)

Mindanao: Zamboanga, 2 ♂, 31 March, 1937.

This form enjoys a wide range in the Philippines, occurring on most of the principal islands from Luzon to Basilan; it is replaced on Guimaras and Panay by *D. p. haematostictum* Sharpe, and on Negros by *D. p. whiteheadi* Hachisuka.

## DICAЕUM HYPOLEUCUM HYPOLEUCUM Sharpe

Basilan: 15 km. northeast of Maluso, 1 ♀, 24 April, 1937.

The identification of this single specimen is none too certain; it agrees with the description of the female of *hypoleucum* as given in McGregor's "Manual"; it likewise agrees with the description of the male of *mindanense*. McGregor quoting Bourns and Worcester MS states that both forms occur together on Basilan. The type of *hypoleucum* came from Basilan (Sharpe, 1876, p. 298), that of *mindanense* from Pasananca, Mindanao (Tweeddale, 1877). As near as I can judge it would appear that two very closely related subspecies are involved, and that Bourns and Worcester were in error in believing that both forms occur together.

In the reference to the original description cited by McGregor the volume no. of *Nature* is wrongly given as **24**; it should be **14**.

**DICAENUM TRIGONOSTIGMUM XANTHOPYGIUM** Tweeddale

Mindoro: Subaan, 2 ♂, 3 ♀, 12-14 March; Anuling, 3 ♂, 7-11 April; Mt. Halcon, 3 ♂, 1 ♀, 20-27 April, 1937.

This form is certainly a race of the widely distributed *D. trigonostigmum*; it is found on Luzon and Polillo as well as on Mindoro. Apparently the following Philippine forms should also be included in *trigonostigmum*; *dorsale* Sharpe, Masbate, Negros and Panay; *pallidior* Bourns and Worcester, Cebu; *intermedium* Bourns and Worcester, Romblon and Tablas; *sibuyanicum* Bourns and Worcester, Sibuyan; *assimile* Bourns and Worcester, Jolo and Tawi Tawi; *sibutuense* Sharpe, Sibutu; *cincircigulare* Tweeddale, Bohol, Leyte, Mindanao and Samar; *besti* Steere, Siquijor.

**DICAENUM PYGMAEUM PYGMAEUM** (Kittlitz)

Luzon: Lagangilang, near Bangued, 1 ♂, 17 January.

Mindoro: Subaan, 1 ♂, 12 March; Pasi, 1 ♂, 13 March; Paltabaan, 1 ♀, 15 April; Mt. Halcon, 3 ♂, 2 ♀, 18 April, 1937.

**PRIONOCHILUS BICOLOR INEXPECTATUS** Hartert

Mindoro: Subaan, 2 ♂, 12 March, 1937.

**NECTARINIIDAE**

**AETHIOPYGA SHELLEYI FLAVIPECTUS** Ogilvie-Grant

Mindoro: Anuling, 1 ♂, 7 April; Mt. Halcon, 1 ♂, 2 ♀, 20-23 April, 1937.

**EUDREPANIS PULCHERRIMA JEFFERYI** Ogilvie-Grant

Luzon: Mt. Santo Tomás, 1 ♂, 16 February, 1937.

**CINNYRIS SPERATA HENKEI** A. B. Meyer

Luzon: Lagangilang, near Bangued, 4 ♂, 2 ♀, 13-19 January, 1937.

This form is the representative of *C. sperata*; it inhabits the Babuyan Islands and the northern part of Luzon; I am unable to state just where the boundary lies between this form and the next. It is the

exact counterpart of *C. s. sperata* except that the maroon portions of the latter are replaced by velvety black and the top of the head is iridescent green instead of coppery; females of the two races are indistinguishable.

CINNYRIS SPERATA SPERATA (Linné)

Mindoro: Merit, 1 ♂, 6 March; Pasi, 3 ♂, 4 ♀, 4-10 March; Subaan, 1 ♂, 1 ♀, 12 March; Calawang, 7 ♂, 1 ♀, 6-14 April; Anuling, 2 ♂, 2 ♀, 7-11 April; Bayog, 1 ♂, 1 ♀, 10 April; Ariaod, 1 ♀, 8 April; Salibagon, 1 ♂, 17 April; Mt. Halcon, 1 ♂, 2 ♀, 24-26 April, 1937.

The Red-breasted Sunbird is widely distributed throughout the Philippines, being recorded from nearly every island from southern Luzon south to, but not including, Mindanao; it also occurs on Palawan. From Mindanao southward its place is taken by the next form. Through a strange lapsus Chasen (1935, p. 277) refers to this species as *Leptocoma brasiliiana sperata*, although *brasiliiana* dates from Gmelin 1789 and *sperata* from the 12th edition of Linné 1766.

The use of the genus *Leptocoma* seems to me unnecessary; it is too close to *Cinnyris*.

CINNYRIS SPERATA JULIAE (Tweeddale)

Basilan: 15 km. northeast of Maluso, 2 ♂, 2 ♀, 17-24 April, 1937.

CINNYRIS JUGULARIS JUGULARIS (Linné)

Luzon: Lagangilang, near Bangued, 2 ♂, 3 ♀, 13-20 January.

Mindoro: Pasi, 1 juv. ♀, 4 March; Subaan, 2 ♂, 3 ♀, 12-14 March; Calawang, 4 ♂, 1 ♀, 6-14 April; Salibagon, 1 ♂, 17 April; Binugsucan, 1 ♀, 5 May.

Mindanao: Zamboanga, 2 ♂, 1 ♀, 30 and 31 March.

Basilan: Near Isabela, 1 ♀, 5 May, 1937.

ANTHREPTES MALACENSIS CHLORIGASTER Sharpe

Basilan: 15 km. northeast of Maluso, 4 ad. ♂, 2 imm. ♂, 1 ♀, 17-30 April, 1937.

ANTHREPTES GRISEIGULARIS (Tweeddale)

Luzon: Lagangilang, near Bangued, 1 ♀, 17 January, 1937.

This specimen is grayer, less greenish than a ♀ from Bataan Province, Luzon, but is in very fresh plumage and not fully adult. Although

*griseigularis* looks as though it should be considered a subspecies of *malacensis*, both occur on Mindanao and the two must, therefore, be kept specifically distinct.

## PLOCEIDAE

### LONCHURA ATRICAPILLA JAGORI (Martens)<sup>1</sup>

Luzon: Lagangilang, near Bangued, 2 ♀?, 20 January.

Mindoro: Binugsucan, 1 ♂, 5 May; Ariaod, 1 ♂, 9 May, 1937.

### LONCHURA PUNCTULATA CABANISI (Sharpe)

Luzon: Lagangilang, near Bangued, 1 ♂, 15 January, 1937.

### LONCHURA LEUCOGASTRA EVERETTI (Tweeddale)

Basilan: 15 km. northeast of Maluso, 2 ♀, 23 and 24 April, 1937.

<sup>1</sup> The earlier *Fringilla minula* Meyen. is a homonym of *Fringilla minula* Temminck.

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